# SFMTA - TASC SUMMARY SHEET

| | | |
|---|---|---|
| ***PreStaff_Date:*** 5/16/2023<br>***Requested_by:*** SFMTA<br>***Handled:*** Gabriel Ho<br>***Section Head :*** MS MS | ☐ ***Public Hearing Consent***<br>☒ ***Public Hearing Regular***<br>☐ ***Informational / Other***<br>PH - Regular | ***No objections:***_____<br>***Item Held:***_____<br>***Other:***_____ |

***Location:*** Sloat Boulevard, Great Highway to Skyline Boulevard

***Subject:*** Sloat Quick-Build Project

**PROPOSAL / REQUEST:**

ESTABLISH – CLASS IV BIKEWAY
-Sloat Boulevard, eastbound and westbound, from 47th Avenue to Skyline Boulevard (two-way protected bikeway on south side of roadway)*
RESCIND – CLASS II BIKEWAY
-Sloat Boulevard, eastbound, from 47th Avenue to 80 feet west of 41st Avenue (eastbound buffered bike lane)
ESTABLISH – TOW-AWAY NO STOPPING ANY TIME
ESTABLISH – TRANSIT BOARDING ISLAND
-Sloat Boulevard, south side, from 50 feet east of 47th Avenue to 65 feet easterly (eastbound stop for lines 18 and 23)
-Sloat Boulevard, south side, from 23 feet east of 45th Avenue to 50 feet easterly (eastbound stop for lines 18 and 23)
-Sloat Boulevard, south side, from 41st Avenue to 50 feet easterly (eastbound stop for lines 18 and 23)
ESTABLISH – BUS ZONE
-Sloat Boulevard, south side, from Skyline Boulevard to 90 feet easterly (eastbound far-side stop)
RESCIND – BUS ZONE
-Sloat Boulevard, south side, from 10 feet east of 47th Avenue to 110 feet easterly (eastbound curbside bus zone)
-Sloat Boulevard, south side, from 40 feet east of 45th Avenue to 105 feet easterly (eastbound curbside bus

**BACKGROUND INFORMATION / COMMENTS**

The Sloat Quick-Build Project aims to improve safety for all users and enhance active-transportation options on Sloat Boulevard between Lake Merced, the San Francisco Zoo, and Ocean Beach. The SFMTA will implement the project in 2023 ahead of the closure (to vehicle traffic) of the Great Highway south of Sloat Boulevard, which is expected to shift more traffic onto Sloat Boulevard west of Skyline Boulevard.

The project spans Sloat Boulevard from the Great Highway to Skyline Boulevard. The scope of work includes upgrading pedestrian crossings, adding a two-way protected bikeway, consolidating and adding on-street blue zones closer to the San Francisco Zoo entrance, and improving transit reliability on the corridor by converting curbside bus zones and flag stops to transit boarding islands.

The project supports implementing goals and priorities identified in the Ocean Beach Master Plan, SFMTA's Vision Zero Program, and District 4 Westside Study. It is coordinated with several adjacent projects, including Sloat Blvd & Skyline Blvd Traffic Signal project, the Ocean Beach Climate Adaptation Project, SFPUC's Westside Pump Station project and Zoo Recycled Water project.

| | |
|---|---|
| ***HEARING NOTIFICATION AND PROCESSING NOTES:*** | ***ENVIRONMENTAL CLEARANCE BY:***<br>☐ ***SFMTA*** ☐ ***Attached*** ☑ ***Pending*** |

***CHECK IF PREPARING SEPARATE SFMTA BOARD CALENDAR ITEM FOR PROPOSAL:*** ☒

ESTABLISH – CLASS IV BIKEWAY

- Sloat Boulevard, eastbound and westbound, from 47th Avenue to Skyline Boulevard (two-way protected bikeway on south side of roadway)*

RESCIND – CLASS II BIKEWAY

- Sloat Boulevard, eastbound, from 47th Avenue to 80 feet west of 41st Avenue (eastbound buffered bike lane)

ESTABLISH – TOW-AWAY NO STOPPING ANY TIME

ESTABLISH – TRANSIT BOARDING ISLAND

- Sloat Boulevard, south side, from 50 feet to 115 feet east of 47th Avenue (eastbound stop for lines 18 and 23)
- Sloat Boulevard, south side, from 23 feet to 88 feet east of 45th Avenue (eastbound stop for lines 18 and 23)
- Sloat Boulevard, south side, from 41st Avenue to 65 feet easterly (eastbound stop for lines 18 and 23)

ESTABLISH – BUS ZONE

- Sloat Boulevard, south side, from Skyline Boulevard to 90 feet easterly (eastbound far-side stop)
- Sloat Boulevard, north side, from 47th Avenue to 38 feet westerly (extends line 23 terminal from 70 feet to 108 feet to accommodate two buses by replacing two unregulated parking spaces)

RESCIND – BUS ZONE

- Sloat Boulevard, south side, from 10 feet to 120 feet east of 47th Avenue (eastbound curbside bus zone)
- Sloat Boulevard, south side, from 40 feet to 145 feet east of 45th Avenue (eastbound curbside bus zone)
- Sloat Boulevard, north side, from 43rd Avenue to 50 feet westerly (westbound curbside bus zone)

RESCIND – FLAG STOP

- Sloat Boulevard, south side, 30 feet east of 43rd Avenue (eastbound far-side stop)
- Sloat Boulevard, south side, 30 feet east of 41st Avenue (eastbound far-side stop)
- Sloat Boulevard, south side, west of Skyline Boulevard (eastbound near-side stop)

ESTABLISH – PASSENGER LOADING ZONE AT ALL TIMES

- Sloat Boulevard, south side, from 159 feet to 251 feet east of 47th Avenue

ESTABLISH – TAXI CAB ONLY AT ALL TIMES

- Sloat Boulevard, south side, from 251 feet to 273 feet east of 47th Avenue

RESCIND - PASSENGER LOADING ZONE, 10AM – 5PM EVERYDAY

- Sloat Boulevard, south side, from 125 feet to 215 feet east of 47th Avenue

RESCIND – TAXI CAB ONLY AT ALL TIMES

- Sloat Boulevard, south side, from 47th Avenue to 30 feet westerly

- Sloat Boulevard, south side, from 215 feet to 235 feet east of 47th Avenue

ESTABLISH – BLUE ZONE

- Sloat Boulevard, center median, from 47th Avenue to 152 feet easterly (7 blue zones at 45-degree angle)
- 47th Avenue, east side, from Sloat Boulevard to 30 feet northerly (1 blue zone)
- Sloat Boulevard, south side, from 115 feet to 159 feet east of 47th Avenue (2 blue zones)

RESCIND – BLUE ZONE

- Sloat Boulevard, south side, from 52 feet west of 46th Avenue (east property line) to 51 feet east of 46th Avenue (east property line) (6 blue zones at 45-degree angle)
- Sloat Boulevard, south side, from 125 feet to 145 feet east of 46th Avenue (1 blue zone)
- Sloat Boulevard, south side, from 45th Avenue to 22 feet easterly (1 blue zone)
- Sloat Boulevard, center median, from 46th Avenue (eastern property line) to 15 feet easterly (1 blue zone)
- Sloat Boulevard, center median, from 46th Avenue (eastern property line) to 35 feet westerly (1 blue zone)

ESTABLISH – RED ZONE

- Sloat Boulevard, north side, from 44th Avenue (eastern property line) to 10 feet easterly (extends existing 15ft red zone)
- Sloat Boulevard, center median, from 46th Avenue (eastern property line) to 15 feet easterly (1 blue zone)
- Sloat Boulevard, center median, from 46th Avenue (eastern property line) to 35 feet westerly (1 blue zone)

ESTABLISH – YELLOW ZONE, 8AM-6PM, MONDAY-SATURDAY

- Sloat Boulevard, north side, from 10 feet to 60 feet east of 44th Avenue (eastern property line) (extends existing 30-foot yellow zone by 20 feet and shifts yellow easterly for daylighting)

RESCIND – ANGLE PARKING

ESTABLISH – PARALLEL PARKING

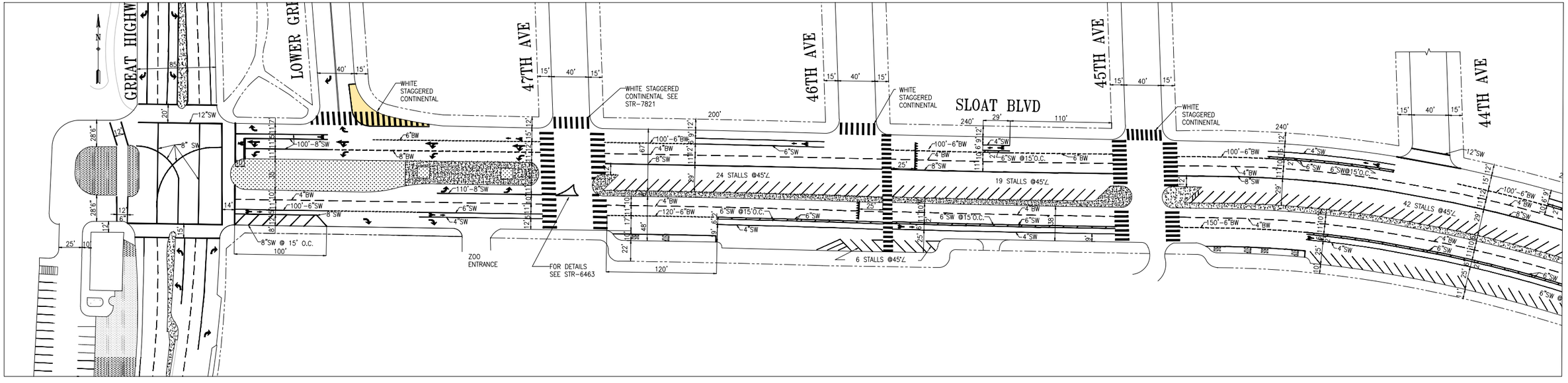
- Sloat Boulevard, south side, from 160 feet east of 45th Avenue to 130 feet west of 41st Avenue
- Sloat Boulevard, south side, from 100 feet west of 41st Avenue to Skyline Boulevard (in the 50-foot wide off-street lot south of the eastbound roadway)*

ESTABLISH – TOW-AWAY NO STOPPING ANYTIME

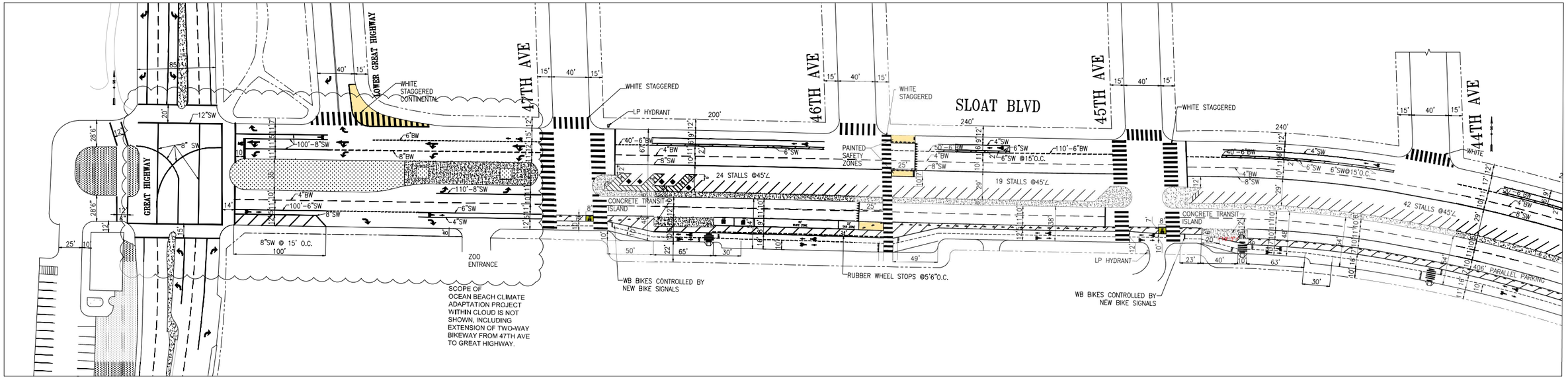
- Sloat Boulevard, south side, from 25 feet west of 47th Avenue to 50 feet east of 47th Avenue
- Sloat Boulevard, south side, from 35 feet west of 46th Avenue (east property line) to 23 feet east of 45th Avenue
- Sloat Boulevard, south side, from 25 feet west of 43rd Avenue (west property line) to 43rd Avenue (east property line)
- Sloat Boulevard, south side, from 180 feet west of 41st Avenue (west property line) to 185 feet east of 41st Avenue (east property line)

# Sloat Quick-Build Project
# Overview Map

# EXISTING CONDITIONS:

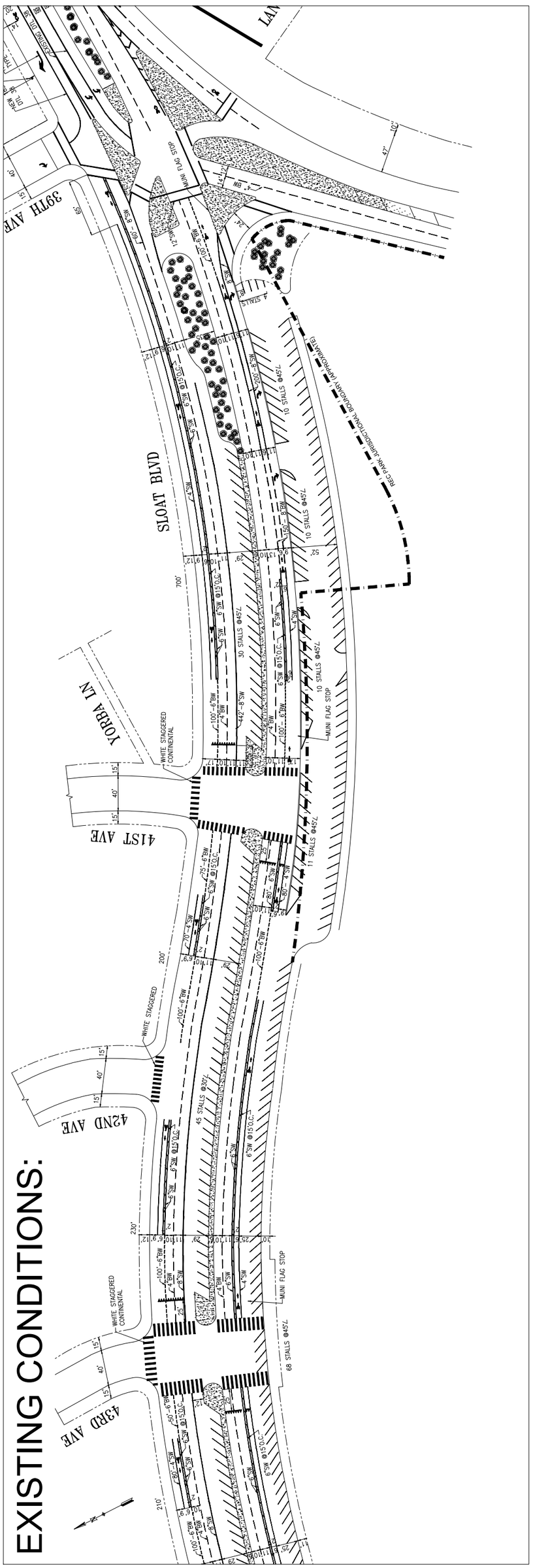


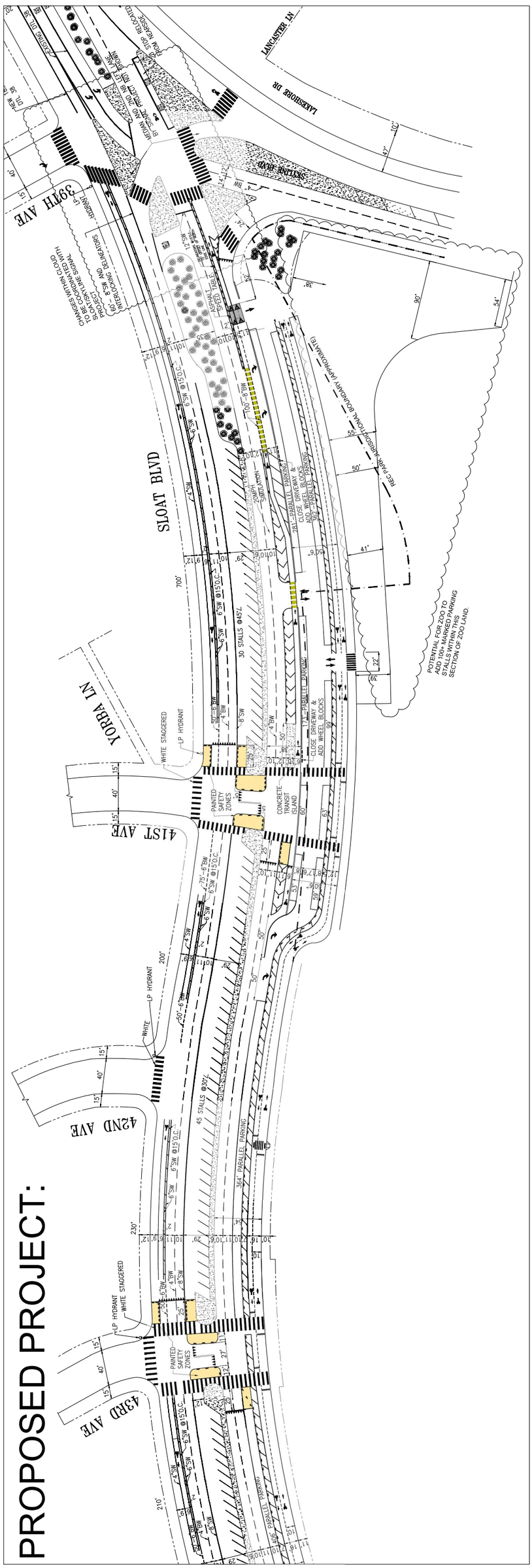

# PROPOSED PROJECT:




SLOAT QUICK-BUILD - PAGE 1 OF 2

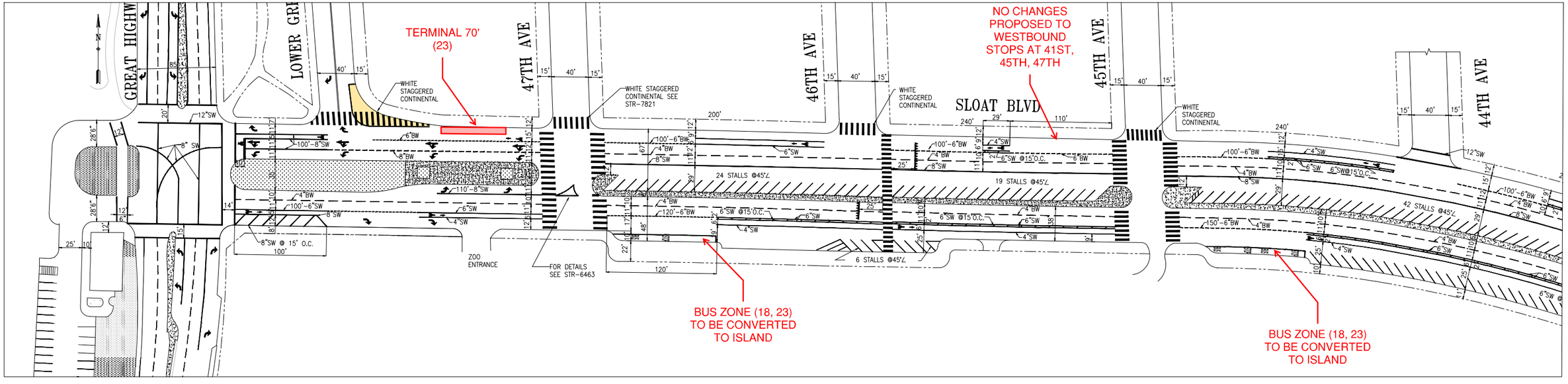
# SLOAT QUICK-BUILD - PAGE 2 OF 2



# TRANSIT PLANS

## EXISTING CONDITIONS:

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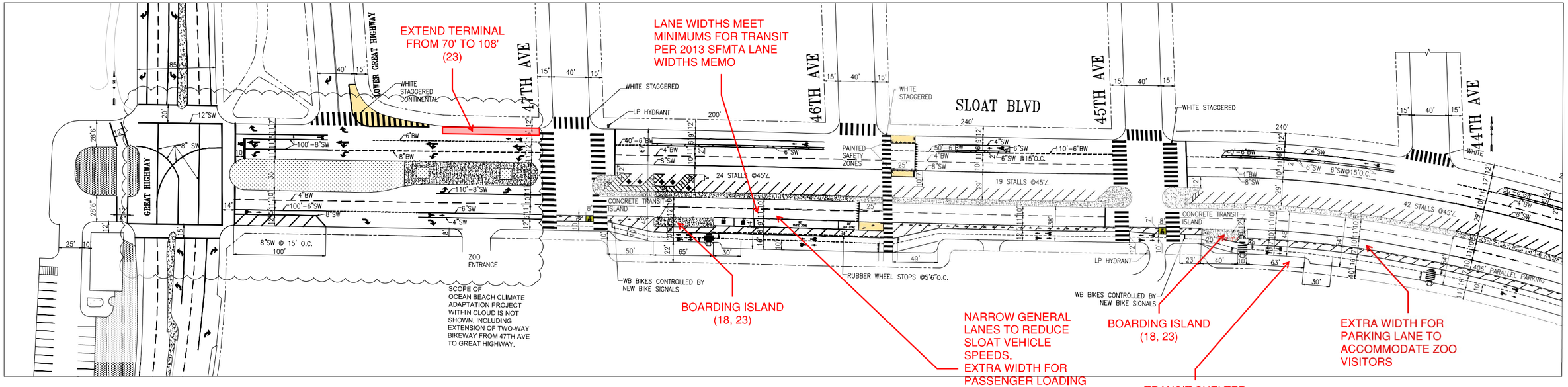
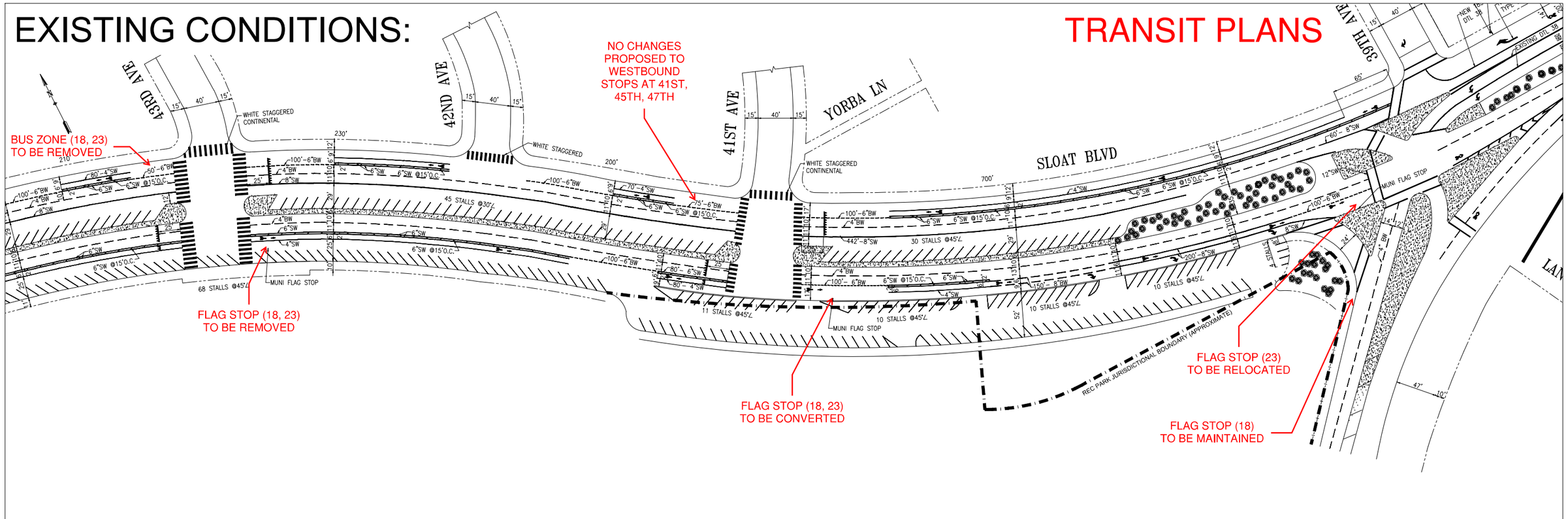



SLOAT QUICK-BUILD - PAGE 1 OF 2

# EXISTING CONDITIONS:

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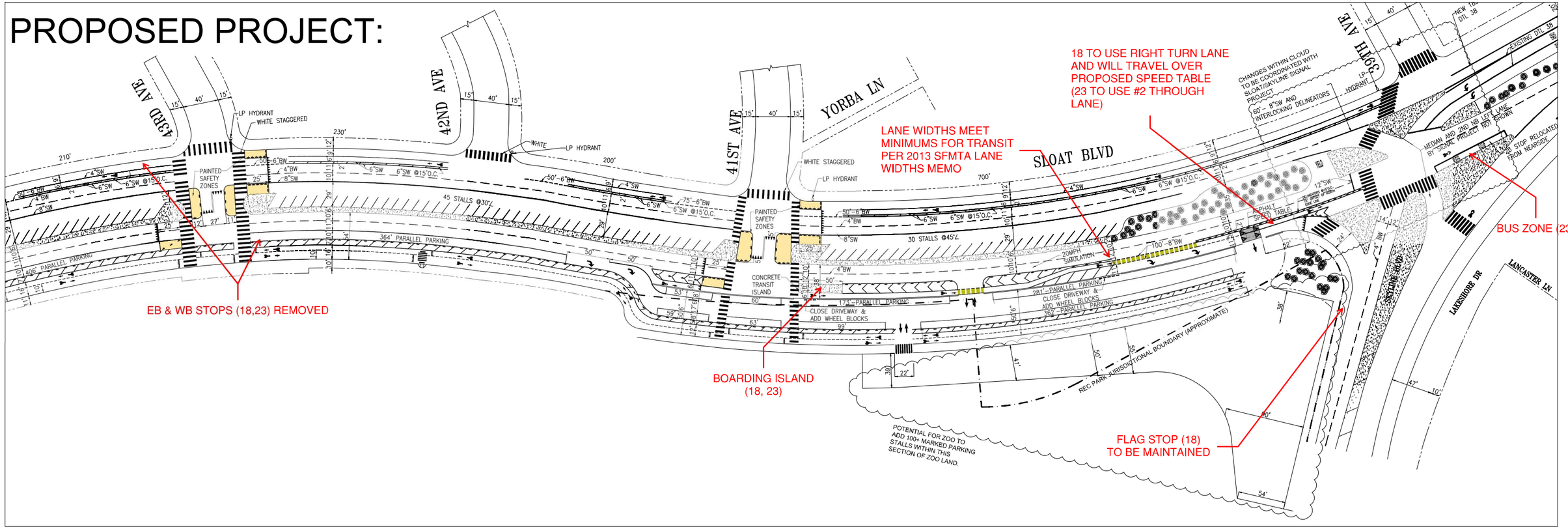
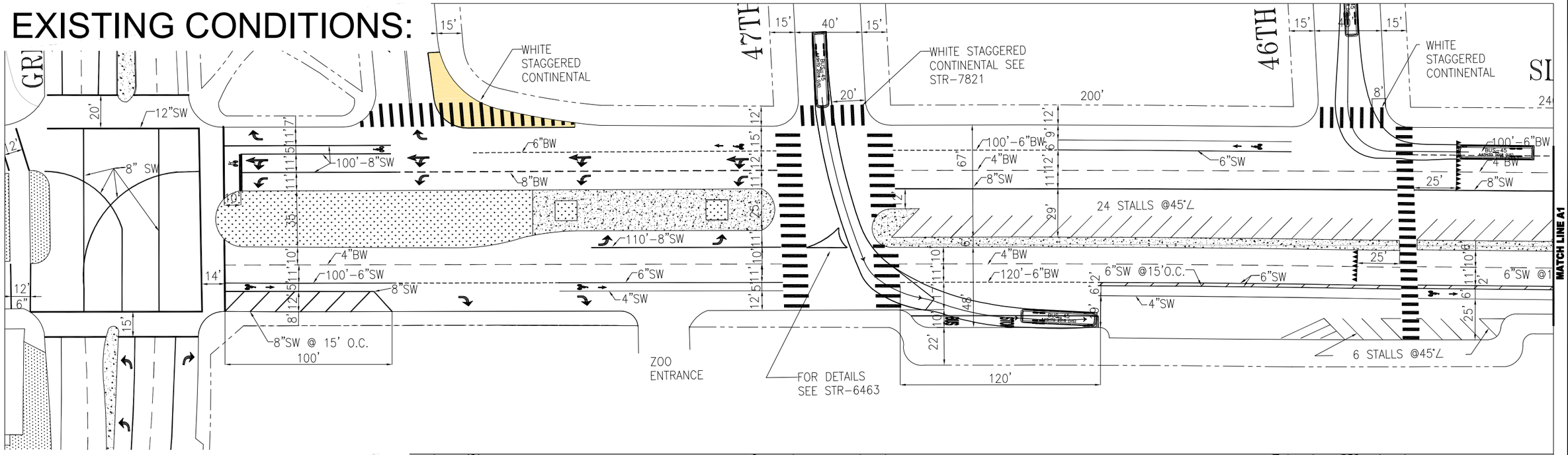



# TRANSIT PLANS

SLOAT QUICK-BUILD - PAGE 2 OF 2

# EXISTING CONDITIONS:

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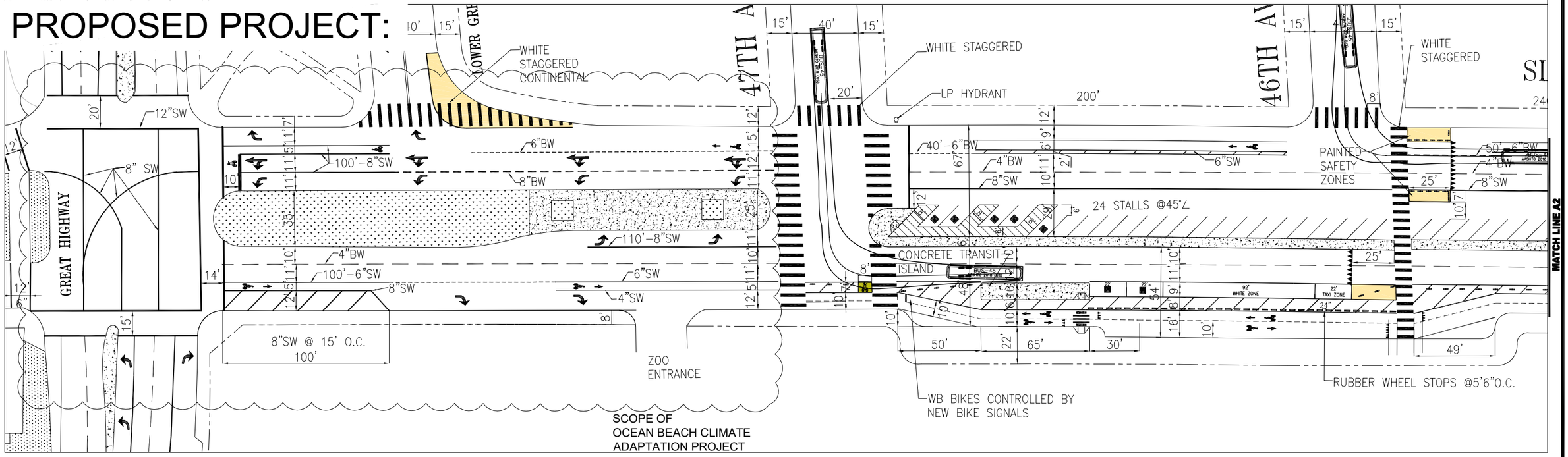



| NO. | DATE | DESCRIPTION | BY | APP |
|---|---|---|---|---|
| 0 | 02-27-2023 | ADD B-45 TURN TEMPLATES FOR MUNI TURNS | J. SUHAIMI | |

TABLE OF REVISIONS
CHECK WITH TRACING TO SEE IF YOU HAVE LATEST REVISION

SFMTA

DRAWN: DATE:
CHECKED: DATE:

APPROVED
SENIOR ENGINEER DATE:
CITY TRAFFIC ENGINEER DATE:

SCALE: 1"=30'
SHEET/SHEETS: 1 OF 4

BUS TURN TEMPLATES

SLOAT BOULEVARD QUICK-BUILD CONCEPT
GREAT HIGHWAY TO 46TH AVE

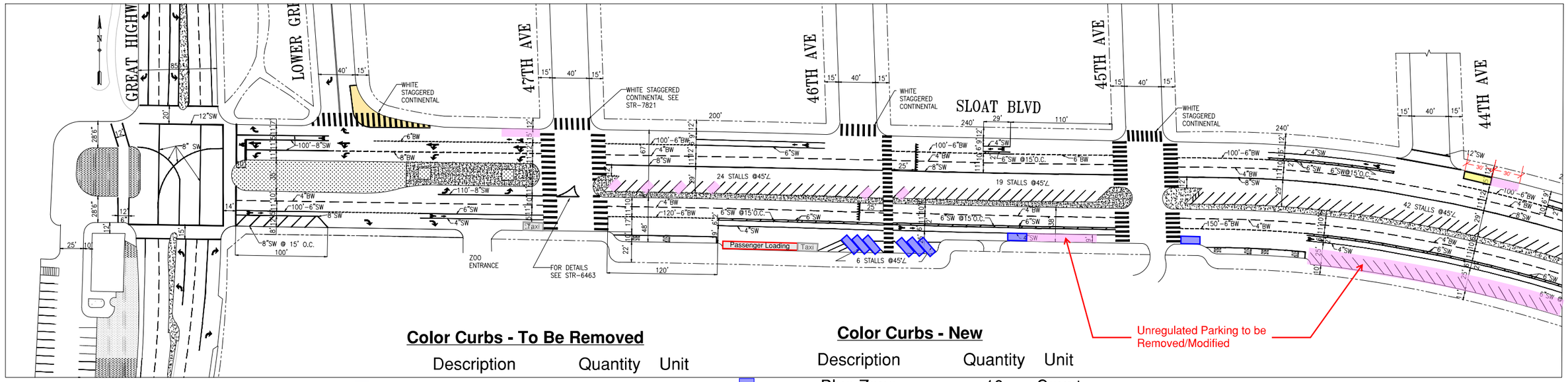
CONTRACT NO.
DRAWING NO.
FILE NO.
REV. NO. 0

C:\Users\ghu\SFMTA\Sloat - Documents\Design\CAD\S File.dwg.dwg GHo Thu May 11,2023 - 8:42 pm
Last Saved Date: 5/11/2023 GHo

EXTERNAL REFERENCES:
FONTS USED:
SCALE FACTOR:
PLOT SCALE:
ORIGIN: OPERATIONS
FILE NAME:
DATE:

# COLOR CURB & CAR PARKING PLANS

## EXISTING CONDITIONS:



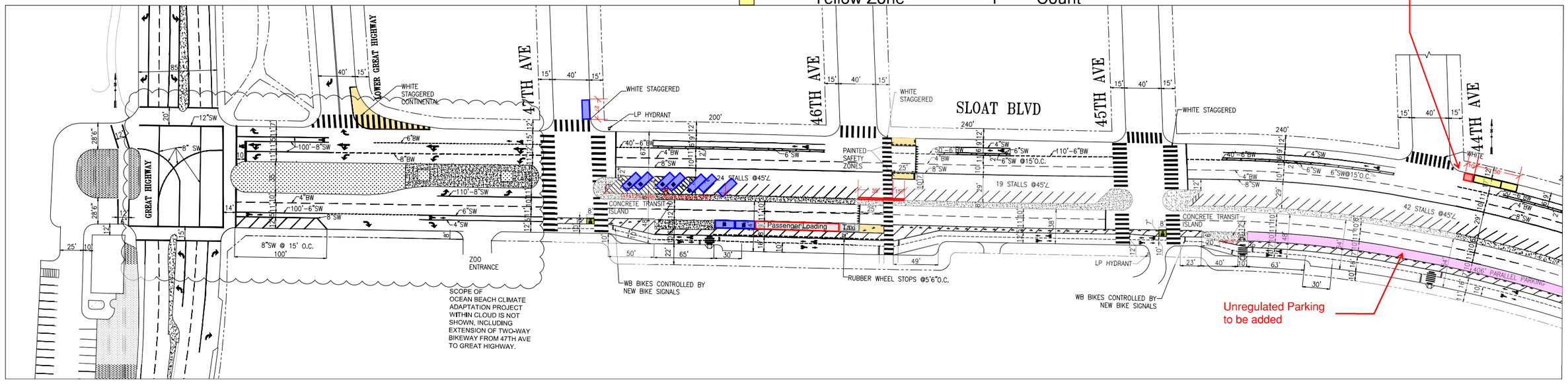

**Color Curbs - To Be Removed**

| Description | Quantity | Unit |
|---|---|---|
| Blue Zone | 8 | Count |
| Passenger Loading Zone | 1 | Count |
| Taxi Zone | 2 | Count |

**Color Curbs - New**

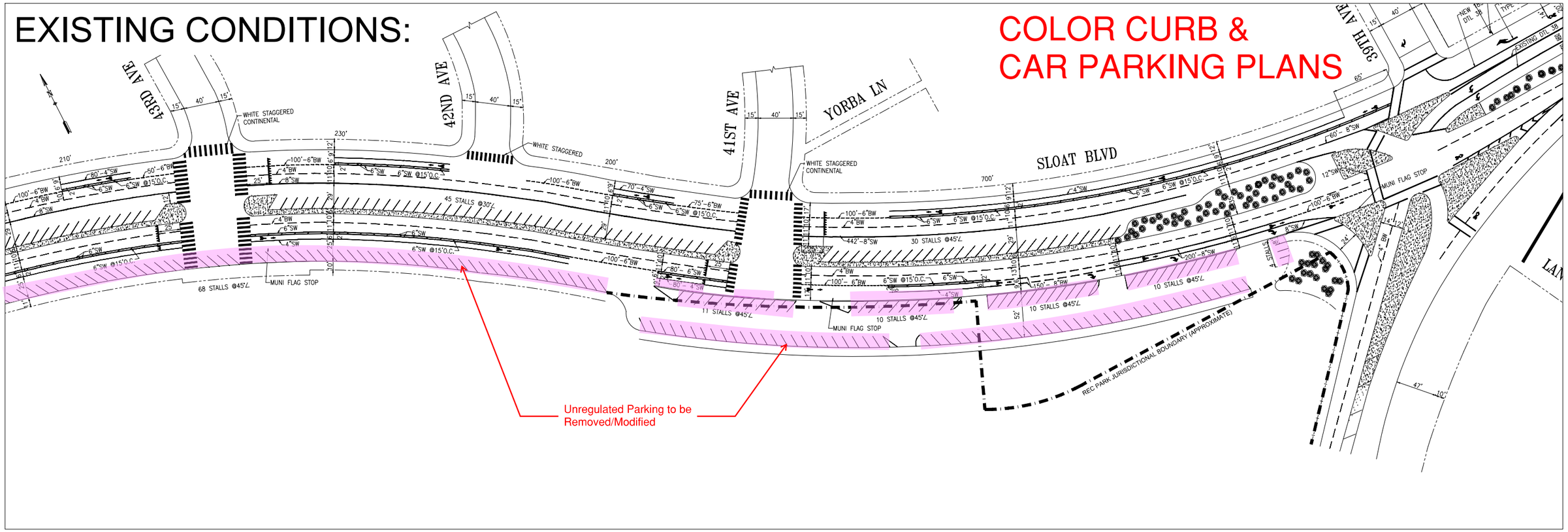
| Description | Quantity | Unit |
|---|---|---|
| Blue Zone | 10 | Count |
| Passenger Loading Zone | 1 | Count |
| Red Zone | 2 | Count |
| Taxi Zone | 1 | Count |
| Yellow Zone | 1 | Count |

## PROPOSED PROJECT:



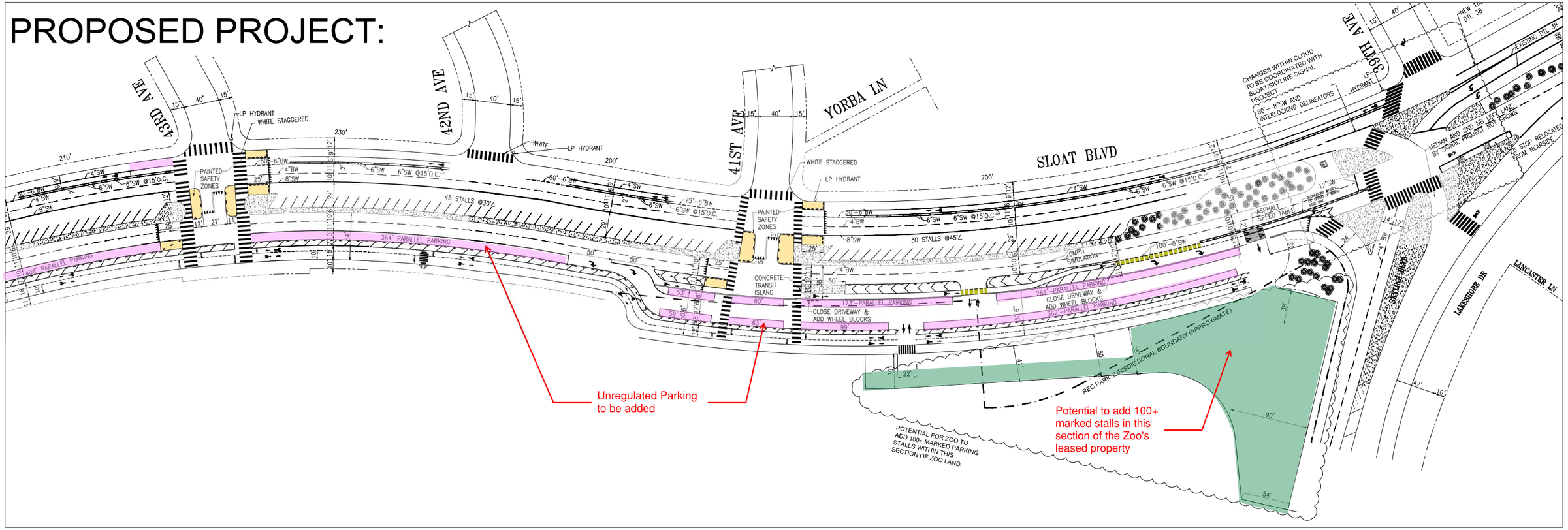

SLOAT QUICK-BUILD - PAGE 1 OF 2

# EXISTING CONDITIONS:




# COLOR CURB & CAR PARKING PLANS

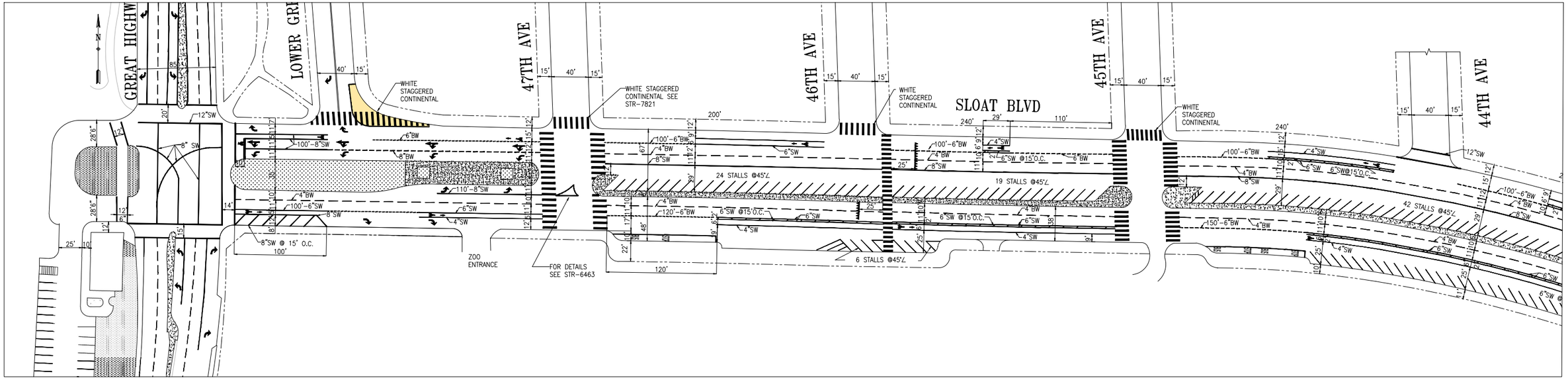
# PROPOSED PROJECT:



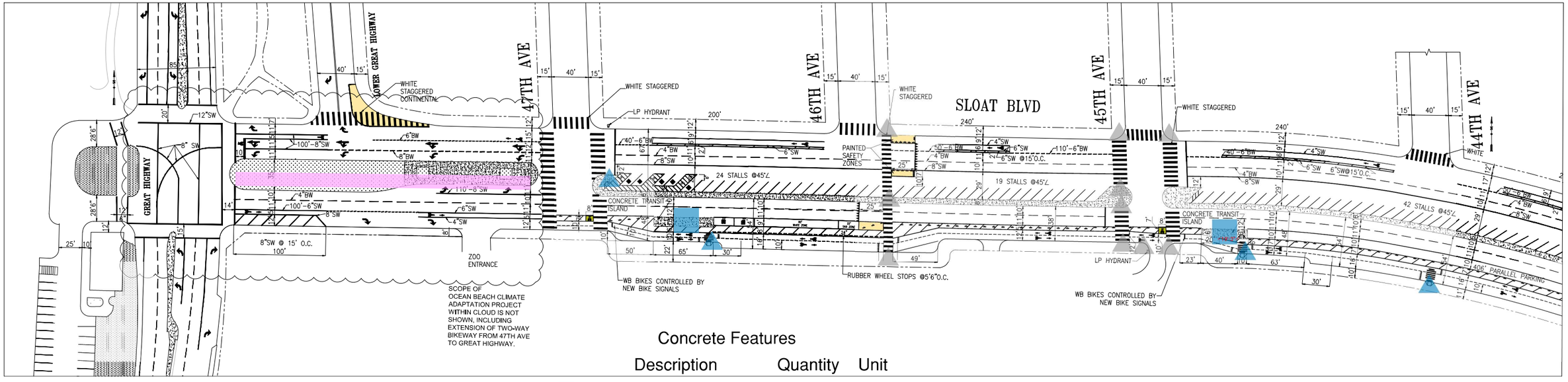

SLOAT QUICK-BUILD - PAGE 2 OF 2

CIVIL PLANS

# EXISTING CONDITIONS:




# PROPOSED PROJECT:



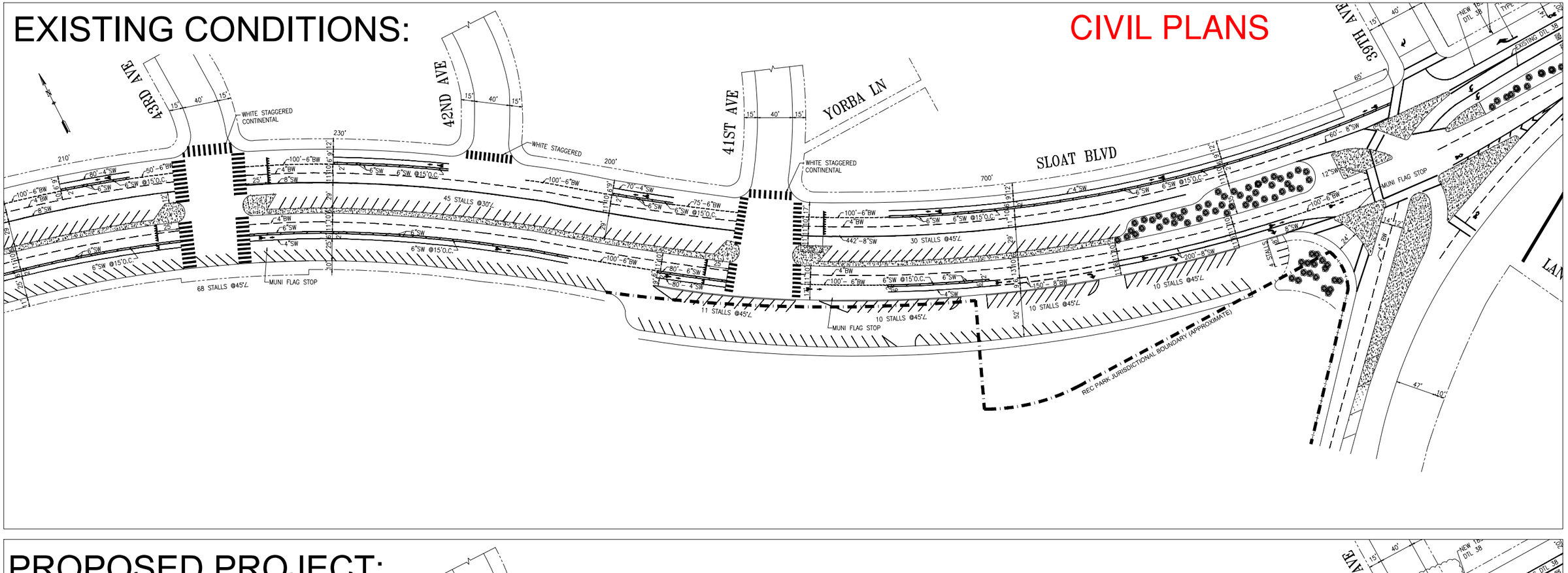

Concrete Features

| Description | Quantity | Unit |
|---|---|---|
| Concrete Transit Island | 2 | Count |
| Curb Ramps (by QB) | 4 | Count |
| Curb Ramps (by WSPS) | 10 | Count |

SLOAT QUICK-BUILD - PAGE 1 OF 2

# EXISTING CONDITIONS:

CIVIL PLANS

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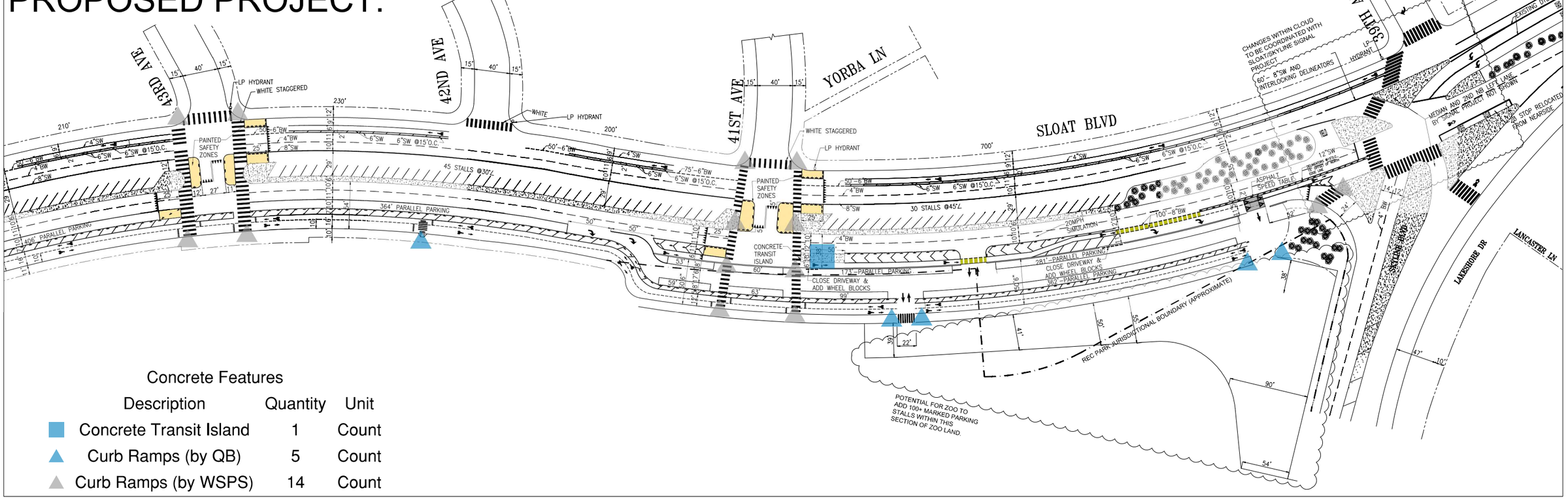



Concrete Features

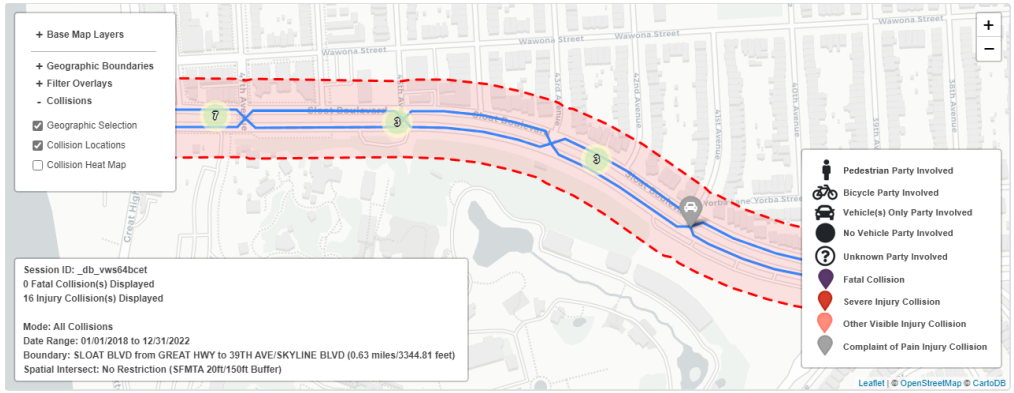
| Description | Quantity | Unit |
|---|---|---|
| Concrete Transit Island | 1 | Count |
| Curb Ramps (by QB) | 5 | Count |
| Curb Ramps (by WSPS) | 14 | Count |

SLOAT QUICK-BUILD - PAGE 2 OF 2

# TransBASE Internal Dashboard

*Geographic Extent: SLOAT BLVD from  GREAT HWY to  39TH AVE/SKYLINE BLVD (0.63 miles/3344.81 feet)*
*Spatial Intersect: No Restriction (SFMTA 20ft/150ft Buffer)*
*Data Range: 01/01/2018 to 12/31/2022*
*Pull Date: 4/24/2023*

## Geographic Extent



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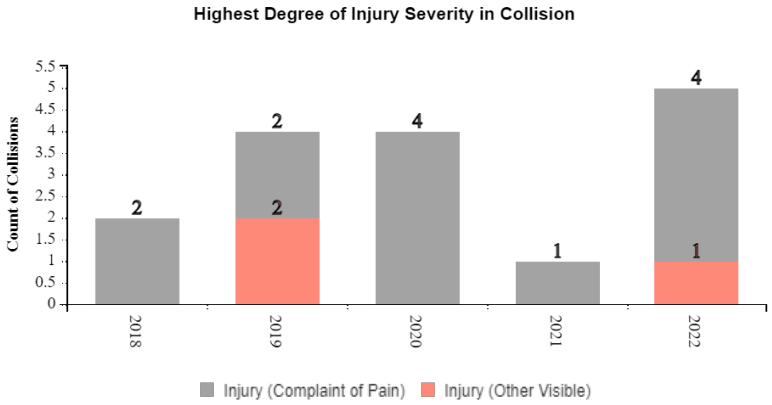
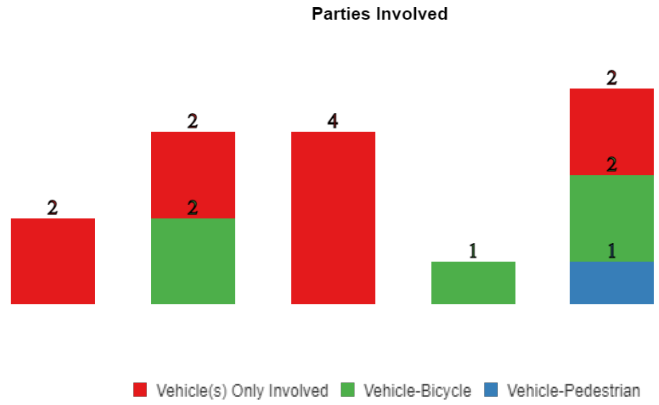
## Graphs and Trends



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*Spatial Intersect: No Restriction (SFMTA 20ft/150ft Buffer)*
*Data Range: 01/01/2018 to 12/31/2022*
*Pull Date: 4/24/2023*

## Collision/Party/Victim Table
## Showing 1 to 16 of 16 entries

**Count of Fatal Collisions: 0**
**Count of Non-Fatal Injury Collisions: 16**
**Total Count of Fatal/Non-Fatal Injury Collisions: 16**

| Case ID | Collision Date | Collision Time | Day of Week | Primary Road | Secondary Road | Distance | Direction | Party 1 Type | Party 1 Direction of Travel | Party 1 Movement Preceeding Crash | Party 2 Type | Party 2 Direction of Travel | Party 2 Movement Preceeding Crash | Vehicle Code Violation | Highest Degree of Injury | Type of Collision | Motor Vehicle Involved With | Hit and Run | Road Surface | Road Condition | Lighting |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 220682791 | 10/05/2022 | 10:21 | Wednesday | 45TH AVE | SLOAT BLVD | 0 | Not Stated | Driver | East | Making Left Turn | Pedestrian | South | Proceeding Straight | CVC 21950(a) | Injury (Complaint of Pain) | Vehicle/ Pedestrian | Other Motor Vehicle | No | Dry | No Unusual Condition/ Not Stated | Daylight |
| 220628159 | 09/14/2022 | 16:27 | Wednesday | SLOAT BLVD | 47TH AVE | 0 | Not Stated | Driver | North | Making Left Turn | Driver | West | Proceeding Straight | CVC 21801(a) | Injury (Complaint of Pain) | Broadside | Other Motor Vehicle | Felony | Dry | No Unusual Condition/ Not Stated | Daylight |
| 220526406 | 08/07/2022 | 15:24 | Sunday | SLOAT BLVD | SKYLINE BLVD | 0 | Not Stated | Driver | East | Proceeding Straight | Driver | North | Proceeding Straight | CVC 22450(a) | Injury (Complaint of Pain) | Broadside | Other Motor Vehicle | No | Dry | No Unusual Condition/ Not Stated | Daylight |
| 220147911 | 03/05/2022 | 14:45 | Saturday | SLOAT BLVD | 47TH AVE | 80 | West | Driver | South | Making Right Turn | Bicyclist | East | Proceeding Straight | CVC 22107 | Injury (Complaint of Pain) | Sideswipe | Bicycle | No | Dry | Other/No Unusual Condition | Daylight |
| 220046608 | 01/21/2022 | 17:50 | Friday | SLOAT BLVD | 42ND AVE | 22 | East | Driver | East | Changing Lanes | Bicyclist | West | Proceeding Straight | CVC 21209(a) | Injury (Other Visible) | Rear End | Bicycle | No | Dry | No Unusual Condition/ Not Stated | Dark - Street Lights |
| 210364238 | 06/11/2021 | 18:44 | Friday | SLOAT BLVD | 45TH AVE | 85 | West | Driver | East | Proceeding Straight | Bicyclist | West | Proceeding Straight | CVC 21703 | Injury (Complaint of Pain) | Rear End | Bicycle | Felony | Dry | No Unusual Condition/ Not Stated | Daylight |
| 200391893 | 06/30/2020 | 15:25 | Tuesday | SLOAT BLVD | 47TH AVE | 0 | Not Stated | Driver | North | Making Left Turn | Driver | West | Proceeding Straight | CVC 21801(a) | Injury (Complaint of Pain) | Broadside | Other Motor Vehicle | No | Dry | No Unusual Condition/ Not Stated | Daylight |
| 200161931 | 03/04/2020 | 02:40 | Wednesday | SLOAT BLVD | GREAT HWY | 0 | Not Stated | Driver | South | Proceeding Straight | | | | CVC 22350 | Injury (Complaint of Pain) | Hit Object | Fixed Object | No | Not Stated | Other/Not Stated | Dark - Street Lights |
| 200133372 | 02/22/2020 | 05:18 | Saturday | SLOAT BLVD | 45TH AVE | 0 | Not Stated | Driver | South | Proceeding Straight | Driver | West | Proceeding Straight | CVC 21453(a) | Injury (Complaint of Pain) | Sideswipe | Other Motor Vehicle | No | Dry | No Unusual Condition/ Not Stated | Dark - Street Lights |
| 200062840 | 01/25/2020 | 19:24 | Saturday | GREAT HWY | SLOAT BLVD | 0 | Not Stated | Driver | South | Making Left Turn | Driver | North | Proceeding Straight | CVC 21453(c) | Injury (Complaint of Pain) | Sideswipe | Other Motor Vehicle | No | Wet | Other/Not Stated | Dark - Street Lights |
| 190268570 | 04/15/2019 | 16:58 | Monday | SLOAT BLVD | 47TH AVE | 0 | Not Stated | Driver | North | Making Left Turn | Driver | West | Proceeding Straight | CVC 22107 | Injury (Complaint of Pain) | Broadside | Other Motor Vehicle | No | Wet | Construction or Repair Zone/Not Stated | Daylight |
| 190201467 | 03/21/2019 | 09:30 | Thursday | SKYLINE BLVD | SLOAT BLVD | 0 | Not Stated | Bicyclist | North | Proceeding Straight | Driver | East | Proceeding Straight | CVC 21800(c) | Injury (Other Visible) | Broadside | Bicycle | No | Dry | No Unusual Condition/ Not Stated | Daylight |

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*Pull Date: 4/24/2023*

| Case ID | Collision Date | Collision Time | Day of Week | Primary Road | Secondary Road | Distance | Direction | Party 1 Type | Party 1 Direction of Travel | Party 1 Movement Preceeding Crash | Party 2 Type | Party 2 Direction of Travel | Party 2 Movement Preceeding Crash | Vehicle Code Violation | Highest Degree of Injury | Type of Collision | Motor Vehicle Involved With | Hit and Run | Road Surface | Road Condition | Lighting |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 190099046 | 02/09/2019 | 06:13 | Saturday | SLOAT BLVD | 42ND AVE | 92 | West | Driver | East | Ran Off Road | Driver | Not Stated | Parked | CVC 21658(a) | Injury (Other Visible) | Rear End | Parked Motor Vehicle | No | Wet | No Unusual Condition/ Not Stated | Dark - Street Lights |
| 190007425 | 01/03/2019 | 17:57 | Thursday | GREAT HWY | SLOAT BLVD | 0 | Not Stated | Bicyclist | East | Proceeding Straight | Driver | South | Proceeding Straight | CVC 21650.1 | Injury (Complaint of Pain) | Broadside | Bicycle | No | Dry | No Unusual Condition/ Not Stated | Dark - No Street Lights |
| 180476216 | 06/27/2018 | 03:33 | Wednesday | SLOAT BLVD | 43RD AVE | 0 | Not Stated | Driver | East | Proceeding Straight | Driver | East | Making Left Turn | CVC 22107 | Injury (Complaint of Pain) | Sideswipe | Other Motor Vehicle | No | Dry | No Unusual Condition/ Not Stated | Dark - Street Lights |
| 180100998 | 02/07/2018 | 07:45 | Wednesday | SLOAT BLVD | 41ST AVE | 0 | Not Stated | Driver | South | Making Right Turn | Driver | West | Proceeding Straight | CVC 21802(a) | Injury (Complaint of Pain) | Broadside | Other Motor Vehicle | No | Dry | No Unusual Condition/ Not Stated | Daylight |

# TransBASE Internal Dashboard

*Geographic Extent: SLOAT BLVD from  GREAT HWY to  39TH AVE/SKYLINE BLVD (0.63 miles/3344.81 feet)*
*Spatial Intersect: No Restriction (SFMTA 20ft/150ft Buffer)*
*Data Range: 01/01/2018 to 12/31/2022*
*Pull Date: 4/24/2023*

## Metadata Information

**Collision Filters**
Database Source: TransBASESF.org
Database Pull Date: 4/24/2023
Collision Level: Injury Collisions
Boundary: SLOAT BLVD from GREAT HWY to 39TH AVE/ SKYLINE BLVD (0.63 miles/3344.81 feet)
Collision Dates: 01/01/2018 to 12/31/2022
Collision Month Filter(s): No Restrictions
Collision Distance: Any Distance
Collision Severity Filter(s): No Restrictions
Primary Collision Factor Filter(s): No Restrictions
Collision Type Filter(s): No Restrictions
Intersection/Midblock: No Restriction (SFMTA 20ft/150ft Buffer)

**Party Filters**
Party Involved Type: No Restrictions
Party Involved Gender: No Restrictions
Party Involved at Fault: No Restrictions
Party Involved Age: No Restriction
Party Involved Sobriety: No Restrictions
Party Involved Condition: No Restrictions
Party Involved Direction of Travel: No Restrictions
Party Involved Safety Equipment 1: No Restrictions
Party Involved Safety Equipment 2: No Restrictions
Party Involved Insurance: No Restrictions
Party Involved Other Associated Factors : No Restrictions
Party Involved Movement Preceding Collision: No Restrictions
Party Involved Vehicle Type: No Restrictions
Party Involved Race: No Restrictions
Party Involved Special Info: No Restrictions
Party Involved Autonomous Vehicle: No Restrictions

**Victim Filters**
Victim Involved Role: No Restrictions
Victim Involved Degree of Injury: No Restrictions
Victim Involved Age: No Restriction
Victim Involved Seating Position: No Restrictions
Victim Involved Safety Equipment: No Restrictions
Victim Involved Ejected: No Restrictions

**Environmental Filters**
Neaest Traffic Control: No Restriction
Intersecting Speed Limit: No Restriction
Intersecting Network: No Restriction
Intersecting Street Class: No Restriction
Weather Description: No Restrictions
Lighting Description: No Restrictions

# South Ocean Beach Coastal Protection Project Traffic Operations Analysis

## Technical Memorandum Draft #1

**Prepared for:**

San Francisco Public Utilities Commission
525 Golden Gate Avenue
San Francisco, CA 94102

**Prepared by:**

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**June 5, 2020**

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# Tables and Figures

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# Appendices

# 1.0 Introduction

The purpose of this Technical Memorandum (memo) is to present the existing traffic and parking conditions along the Great Highway, Sloat Boulevard, and Skyline Boulevard (i.e., project area), and to present traffic operations analysis results for the South Ocean Beach Coastal Protection Project. This memo is divided into the following sections:

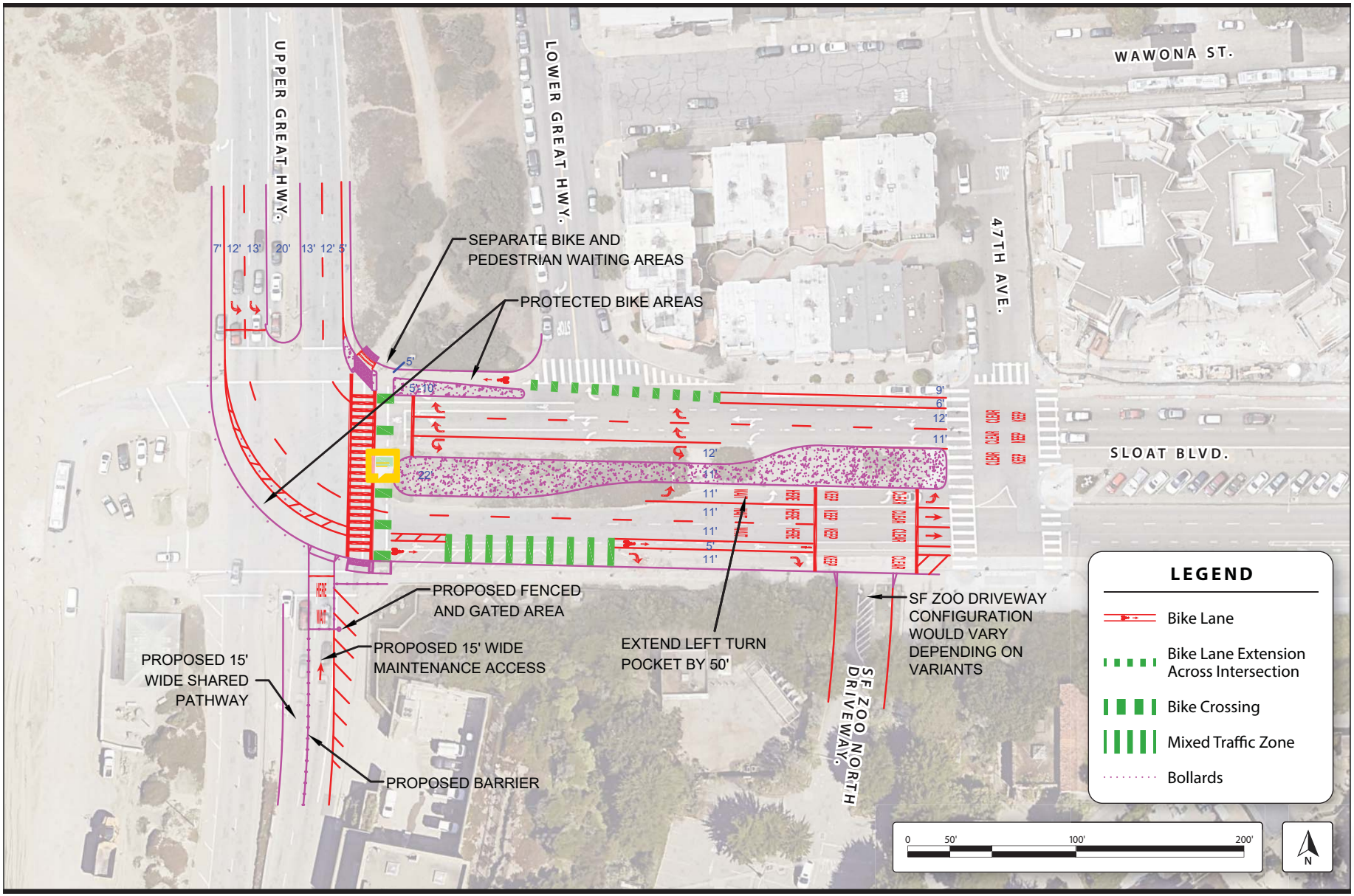
- ***Chapter 1*** – Introduction, provides an overview of this memo and describes the proposed project.
- ***Chapter 2***– Settings, describes the existing transportation conditions in the project area.
- ***Chapter 3***– Future Traffic Volumes, describes the assumptions used to estimate traffic volumes and parking demand in the project area under Existing plus Project Conditions.
- ***Chapter 4***– Existing plus Project Conditions, presents the traffic operations analysis results under Existing plus Project Conditions.
- ***Chapter 5***– Conclusion, provides a brief summary of traffic analysis results.

## 1.1 Project Description

The proposed project would close Great Highway between Sloat and Skyline boulevards to vehicular traffic in both directions. The intersection of Great Highway and Sloat Boulevard would become a signalized "L" shaped intersection. All Upper Great Highway southbound traffic would be forced to turn left onto Sloat Boulevard, and Sloat Boulevard westbound traffic would have the option to turn right onto Upper Great Highway or make a U-turn at this intersection. The south leg of this intersection would be converted into a multi-purpose path for pedestrians and bicyclists and a one-way northbound service road for San Francisco Public Utilities Commission (SFPUC) vehicles. The existing east crosswalk would be expanded to include a 10-foot-wide dedicated bicycle crossing. The existing Muni bus layover/ turn-around area would be relocated from the area west of the Upper Great Highway/Sloat Boulevard intersection to the existing bus stop on the south side of Sloat Boulevard, west of 47th Avenue. **Figure 1** presents a detailed illustration of the proposed changes at the intersection of Great Highway and Sloat Boulevard.

The San Francisco Zoo (SF Zoo) currently provides a total of 475 parking spaces, including the existing 440-space public parking lot and 35 on-street parking spaces on Zoo Road for employees. In addition, a 50,000 square-foot dirt area on the south side of Zoo Road is used for valet operations. The existing public parking lot is accessed via eastbound Sloat Boulevard or northbound Great Highway, and all exiting vehicles use northbound Great Highway. The proposed project would change the number of parking spaces and access locations under each variant as follows:

- **Project Variant #1** – The existing 50,000 square foot dirt area on the south side of Zoo Road would be expanded to approximately 96,000 square-feet and paved with 280 parking stalls for public parking. The SF Zoo would provide a total of 755 parking spaces, including the existing 440-space public parking lot, 35 employee parking spaces on Zoo Road, and 280 parking stalls on the south side of Zoo Road. Both public parking lots would be accessed via the Sloat Boulevard gate only, with one inbound lane and one outbound lane. Pedestrians and bicyclists would continue to use the Sloat Boulevard gate. The Zoo Road gate would remain open via Herbst Road to employees and deliveries only.




South Ocean Beach Coastal Protection Project

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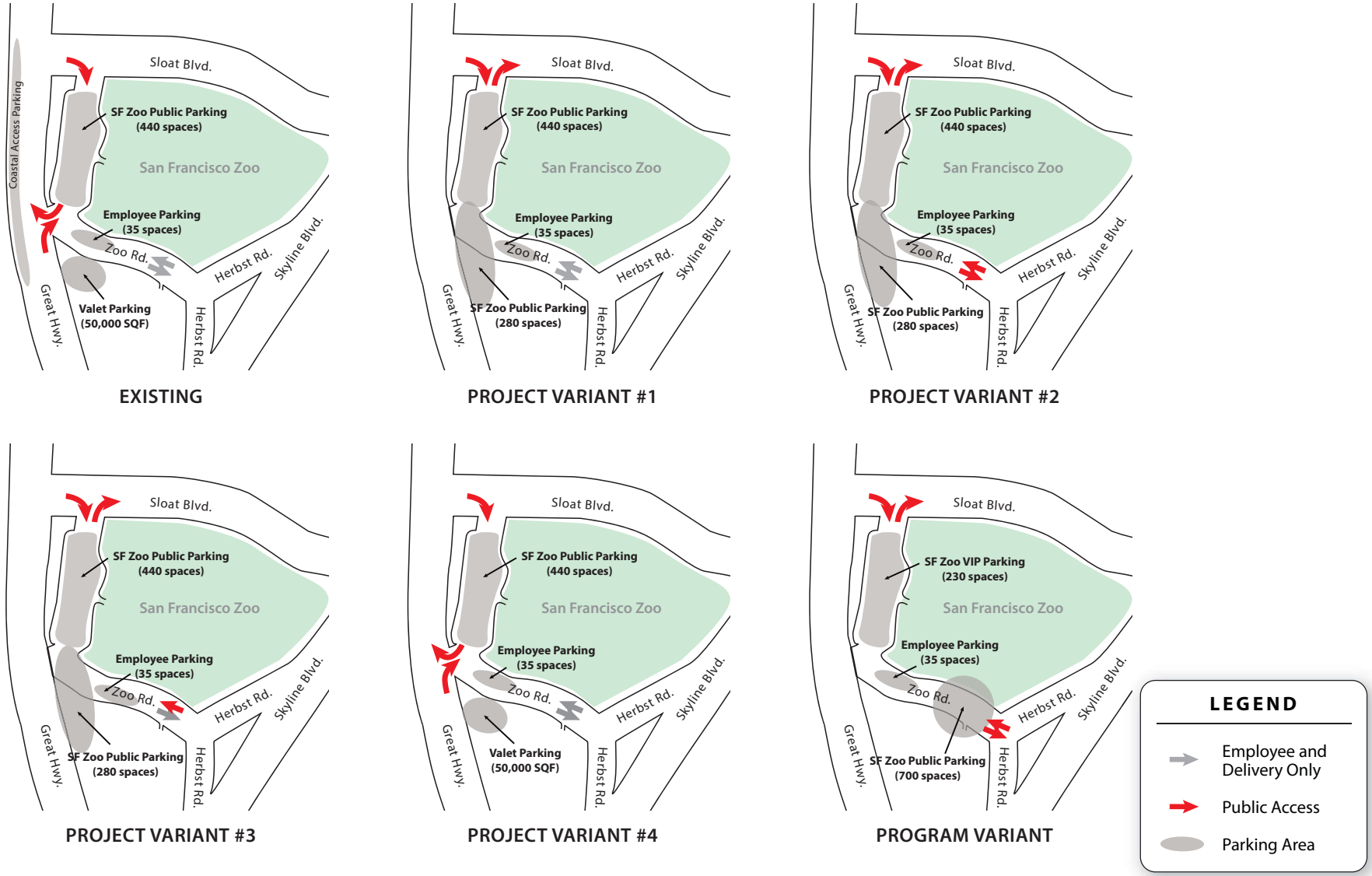
Figure 1

Proposed Changes at Upper Great Highway and Sloat Boulevard Intersection

- **Project Variant #2** –The number of parking spaces would be the same as Project Variant #1. All parking spaces would be accessed via the Sloat Boulevard gate and the Zoo Road gate via Herbst Road. Both gates would include one inbound lane and one outbound lane, and would provide pedestrian and bicycle access.
- **Project Variant #3** – The number of parking spaces would be the same as Project Variant #1. All parking spaces would be accessed via the Sloat Boulevard gate and the Zoo Road gate via Herbst Road. The Sloat Boulevard gate would include one inbound lane and one outbound lane, and would continue to provide pedestrian and bicycle access. The Zoo Road gate would include one inbound lane for vehicular access, and no pedestrian and bicycle access would be allowed.
- **Project Variant #4** – There would be no change in parking spaces from the Existing Condition. All parking spaces would be accessed via the Sloat Boulevard gate and a one-way northbound service road that connects Skyline Boulevard to Zoo Road. All exiting vehicles would use a one-way northbound service road that connects to Sloat Boulevard. The Sloat Boulevard gate would continue to provide pedestrian and bicycle access, and the Zoo Road gate would remain open to employees and deliveries only.
- **Program Variant** – The existing 440-space public parking lot would be converted into a 230-space VIP parking lot, and a new 700-space parking structure would be constructed on Zoo Road. The existing 50,000 square foot dirt area would be removed, and 35 on-street employee parking spaces would remain on Zoo Road. The SF Zoo would provide 965 parking spaces in total. The 230-space VIP parking lot would be isolated from other parking spaces and only accessed via the Sloat Boulevard gate with one inbound and one outbound lane. The 700-space parking structure and 35 on-street employee parking spaces would be accessed via Zoo Road with one inbound lane and one outbound lane via Herbst Road. Both the Sloat Boulevard and Zoo Road gates would provide pedestrian and bicycle access.

Since July 2019, approximately 200 on-street parking spaces located along the median of Great Highway have been removed. The proposed project would remove 35 parking spaces in the Golden Gate National Recreation Area (GGNRA) parking lot, located at the western end of Sloat Boulevard. To partially replace these displaced parking spaces, San Francisco Parks and Recreation would provide a 50-space parking lot in a closed portion of Great Highway west of Skyline Boulevard. This lot would be accessed via Skyline Boulevard. In addition, parking meters or the equivalent would be added to the SF Zoo parking lot(s) to accommodate displaced coastal parking demand.

**Figure 2** presents the proposed changes under each variant.




South Ocean Beach Coastal Protection Project

Figure 2
Proposed Changes to San Francisco Zoo Access

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# 2.0 Settings

This chapter describes the existing traffic, bicycle, pedestrian, and parking conditions in the project area and the SF Zoo transportation survey data. Data collection was conducted in two separate phases. The first phase of data collection involved collecting 12-hour bi-directional vehicle volumes, speed, and vehicle classification data over a five-day period at three key locations within the project area in order to identify an appropriate time period for the second phase of data collection. Based on the data collected during Phase I, CHS Consulting Group (CHS) established a weekday two-hour peak period (4 to 6 PM) and a weekend four-hour peak period (12 to 4 PM), in consultation with San Francisco Planning Department staff and supplemental data provided by the SF Zoo.[1] During Phase II, CHS collected multimodal intersection turning movement counts during the weekday PM peak period (4 to 6 PM) at 19 study intersections and the weekend midday peak period (12 to 4 PM) at four study intersections. CHS also collected parking occupancy data and conducted a travel survey of SF Zoo patrons during the weekend. **Table 1** presents the summary of data collection completed.

### Table 1. Data Collection Summary

| | Phase I | Phase II | |
|---|---|---|---|
| | **Weekday and Weekend** | **Weekday** | **Weekend** |
| **Date** | Saturday, May 11 through Wednesday, May 15, 2019 | Tuesday, July 9, 2019 | Sunday, June 30, 2019<br>Sunday, July 14, 2019<br>Saturday, July 27, 2019<br>Saturday, October 26, 2019 |
| **Time Period** | 7 AM to 7 PM | 4 PM to 6 PM | 12 PM to 4 PM[1]<br>10 AM to 5 PM[2] |
| **Location** | 3 Intersections | 19 Intersections | 4 Intersections |
| **Data Collected** | Bidirectional vehicle volumes<br>Vehicle speed<br>Vehicle classification | Vehicle turning movements<br>Bicycle volumes<br>Pedestrian volumes<br>SF Zoo entry volumes | Vehicle turning movements<br>Bicycle volumes<br>Pedestrian volumes<br>Parking occupancy<br>SF Zoo entry volumes<br>SF Zoo travel survey |

Notes:
1. Multimodal counts were collected between 12 PM and 4 PM.
2. SF Zoo travel survey and parking survey was conducted on two Sundays, each from 10 AM to 3 PM and from 12 PM to 5 PM.

[1] SF Zoo indicated that the peak hours of operation occur between 12 and 4 PM on weekend.

## 2.1 Weekday and Weekend Traffic Volumes (Phase I)

CHS collected five-day, twelve-hour (7 AM to 7 PM) bi-directional traffic volumes from Saturday, May 11 through Wednesday, May 15, 2019 at the following three key intersections:

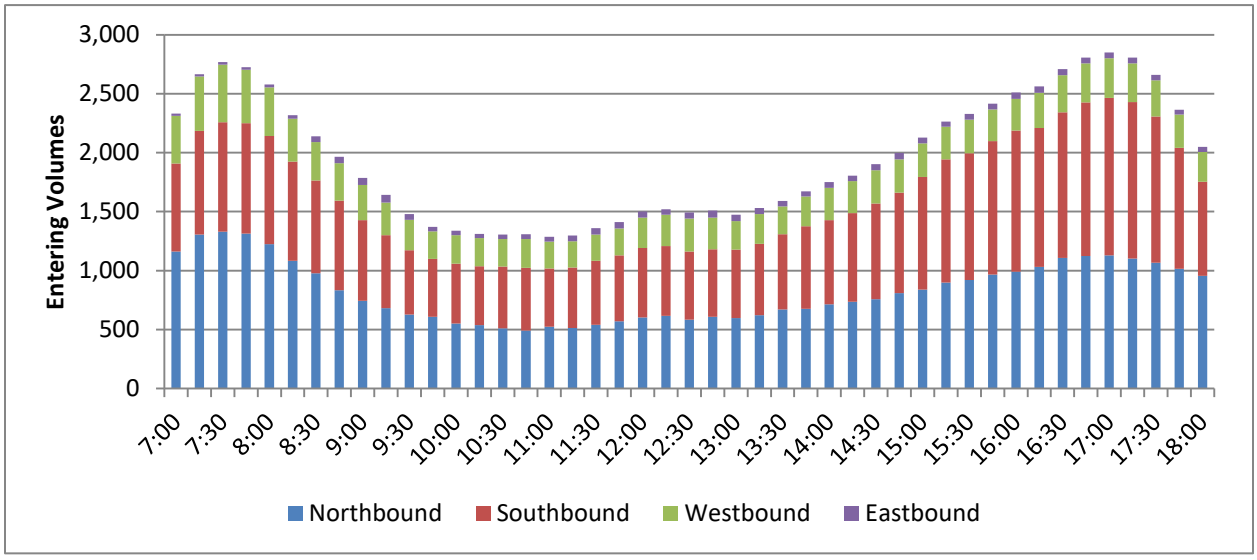
1. Upper Great Highway at Sloat Boulevard
2. Skyline Boulevard at Sloat Boulevard
3. Skyline Boulevard at Great Highway

**Appendix A** includes detailed five-day, twelve-hour traffic data and a summary table.

### 2.1.1 Weekday Traffic Volumes

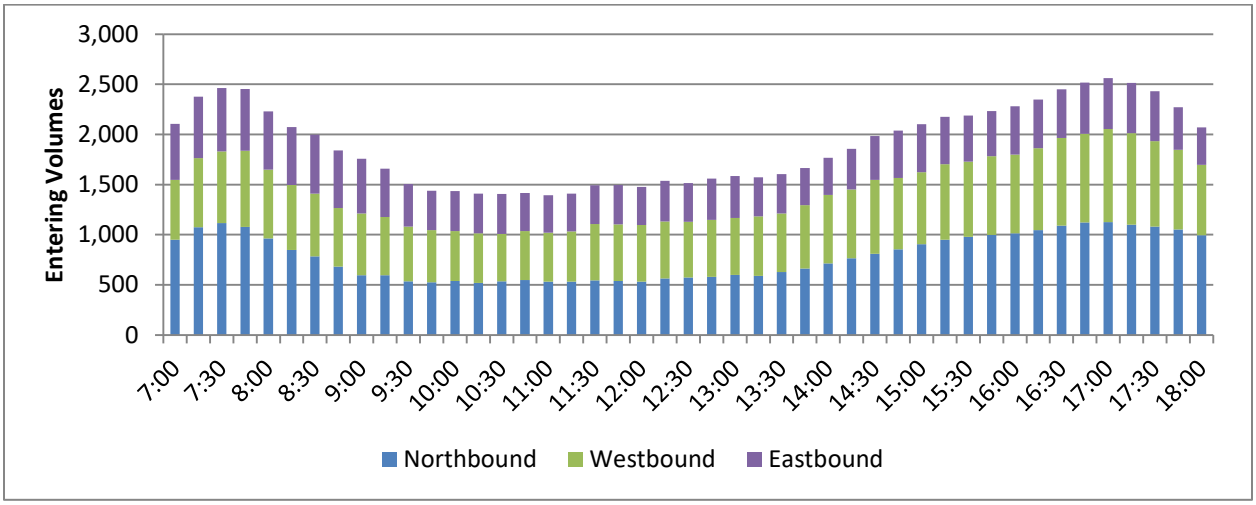
During the five-day period stretching from Saturday to Wednesday, the highest volume period occurred on Tuesday for all three key intersections. **Exhibits 1 through 3** show the rolling one-hour volume of vehicles on Tuesday, May 14, 2019 at each intersection, respectively. They show that the three key study intersections experience the highest weekday traffic volumes at similar times of day, between 7:30 and 8:30 AM and 5 and 6 PM. The weekday PM peak hour volumes are generally higher than AM peak hour, with the exception of the Skyline Boulevard/Great Highway intersection whose AM peak hour volumes are approximately three percent higher than the PM peak hour. After conferring with San Francisco Planning Department staff, it was determined that collecting weekday PM peak period traffic volumes (4 to 6 PM) on a Tuesday would generally represent a worst-case for existing condition.

**Exhibit 1. Hourly Traffic Volumes on Tuesday at Upper Great Highway/Sloat Boulevard**



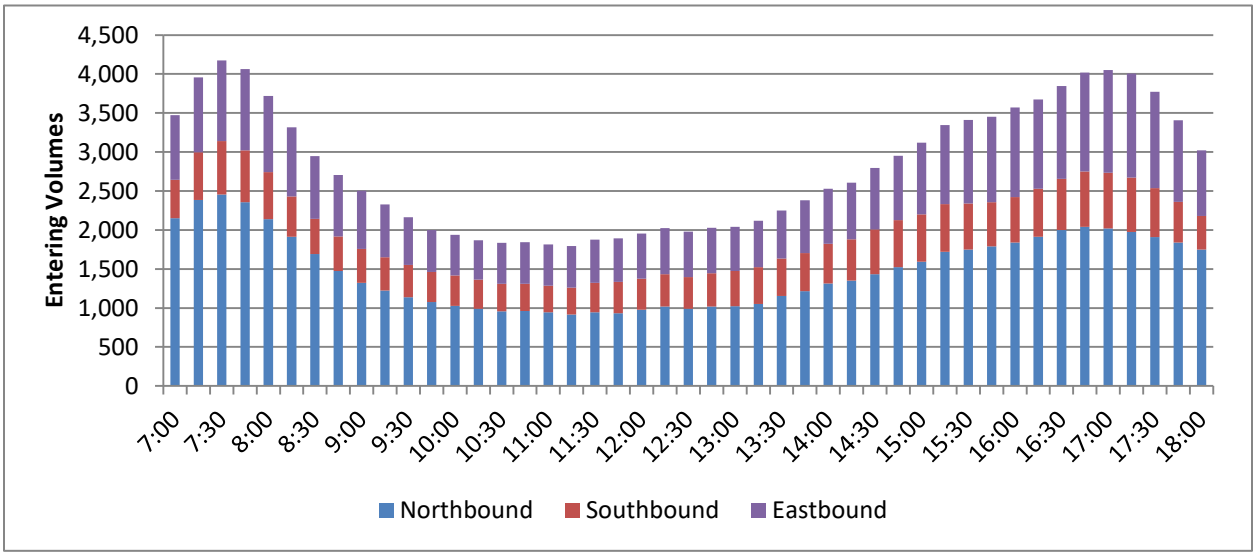

Source: CHS Consulting Group, 2020.

## Exhibit 2. Hourly Traffic Volumes on Tuesday at Skyline Boulevard/Sloat Boulevard




Source: CHS Consulting Group, 2020.

## Exhibit 3. Hourly Traffic Volumes on Tuesday at Skyline Boulevard/Great Highway

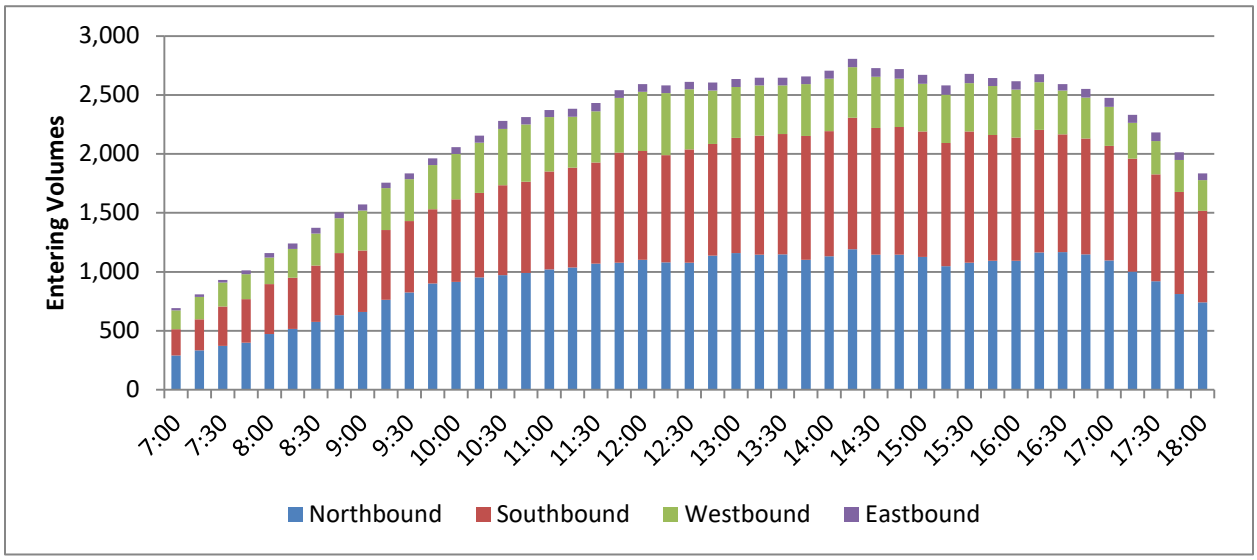



Source: CHS Consulting Group, 2020.

### 2.1.2 Weekend Traffic Volumes

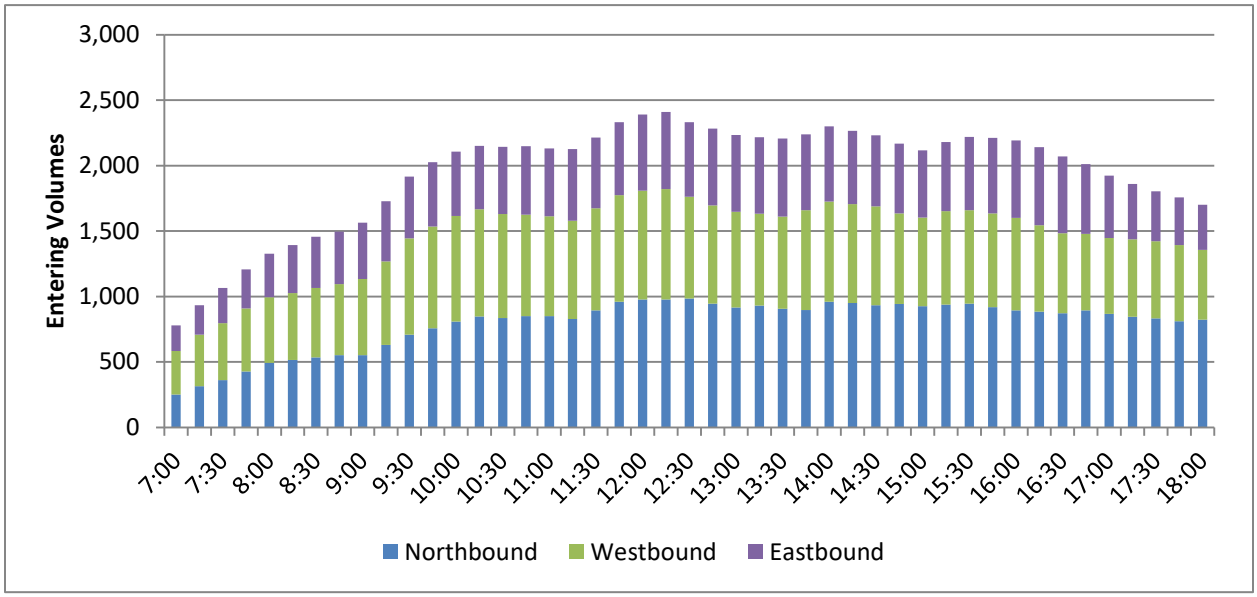
Weekend peak hour traffic volumes were generally lower than weekday volumes. The highest Saturday traffic volume period occurred on Saturday for all three key intersections. **Exhibits 4 through 6** show the rolling one-hour volume of vehicles on Saturday, May 11, 2019 at each intersection, respectively. The highest weekend traffic volumes occurred during the early afternoon between 2:15 and 3:15 PM at the Upper Great Highway/Sloat Boulevard and Skyline Boulevard/Great Highway intersections, and between 12:15 and 1:15 PM at the Skyline Boulevard/Sloat Boulevard intersection. According to the SF Zoo, the peak zoo traffic occurs between 12 and 4 PM on weekends. Therefore, the weekend midday peak period was determined as a four-hour period between 12 and 4 PM.

## Exhibit 4. Hourly Traffic Volumes on Saturday at Upper Great Highway/Sloat Boulevard



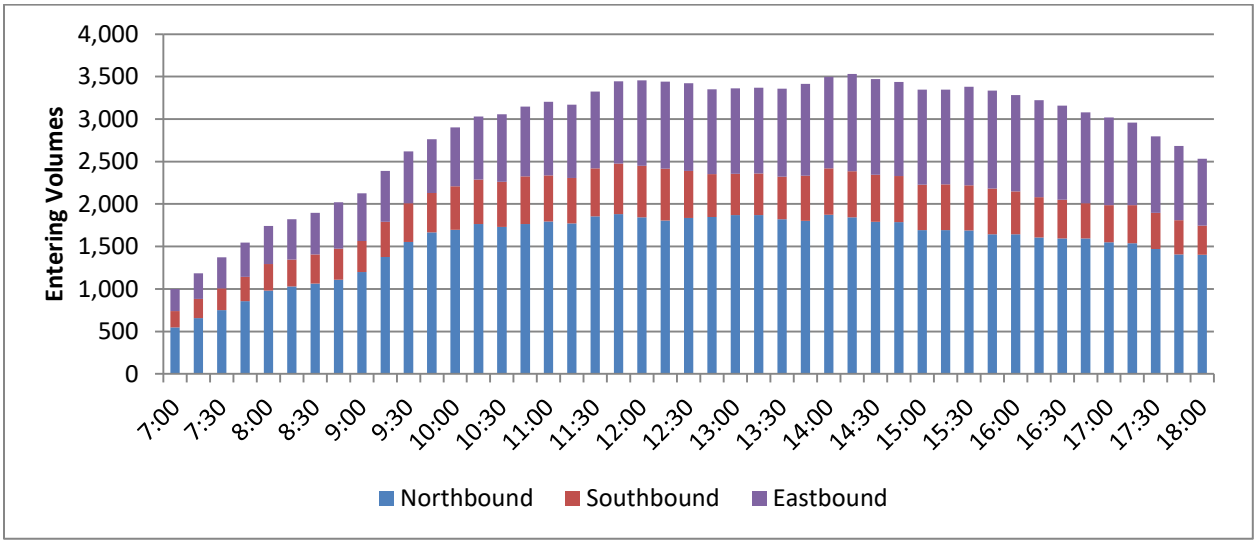

Source: CHS Consulting Group, 2020.

## Exhibit 5. Hourly Traffic Volumes on Saturday at Skyline Boulevard/Sloat Boulevard




Source: CHS Consulting Group, 2020.

**Exhibit 6. Hourly Traffic Volumes on Saturday at Skyline Boulevard/Great Highway**




Source: CHS Consulting Group, 2020.

## 2.2 Weekday PM Peak Period (Phase II)

CHS collected multimodal turning movement counts on Tuesday, July 9, 2019 between 4 and 6 PM at 19 intersections in an area that is bounded by Taraval Street to the north, Skyline Boulevard to the east, and the Great Highway/Skyline Boulevard intersection to the south. **Appendix B** includes detailed vehicle, bicycle, and pedestrian data sheets for these 19 intersections. Among the 19 intersections, the following seven intersections located within the project area were selected for a detailed traffic analysis:

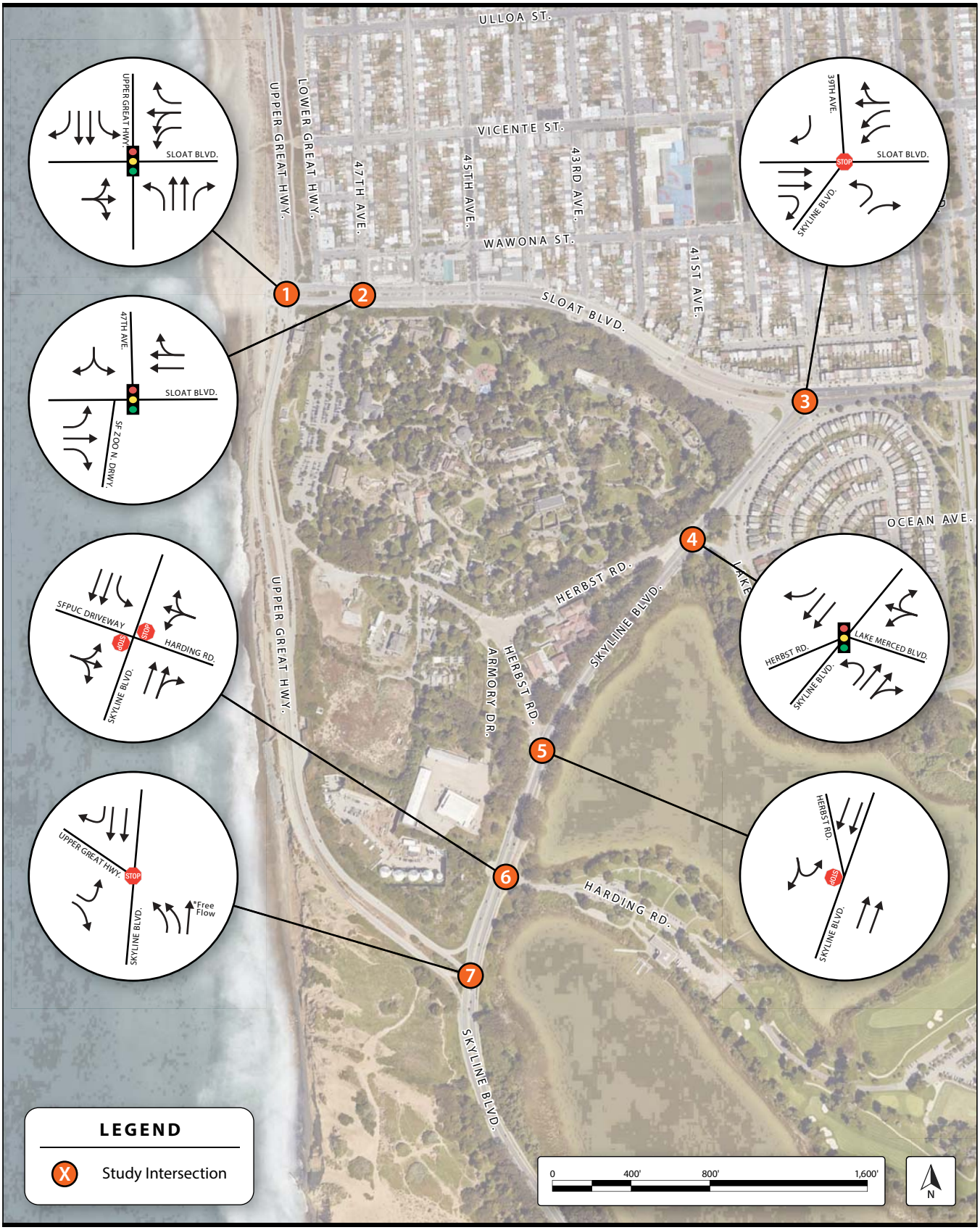
1. Upper Great Highway / Sloat Boulevard
2. Sloat Boulevard/47th Avenue
3. Sloat Boulevard/Skyline Boulevard
4. Skyline Boulevard/Herbst Road North/Lake Merced Boulevard
5. Skyline Boulevard/Herbst Road South
6. Skyline Boulevard/Harding Road
7. Skyline Boulevard/Great Highway

**Figure 3** presents the existing intersection lane configurations for the seven study intersections.

### 2.2.1 Weekday PM Peak Hour Traffic Condition

#### Weekday PM Peak Hour Traffic Volumes

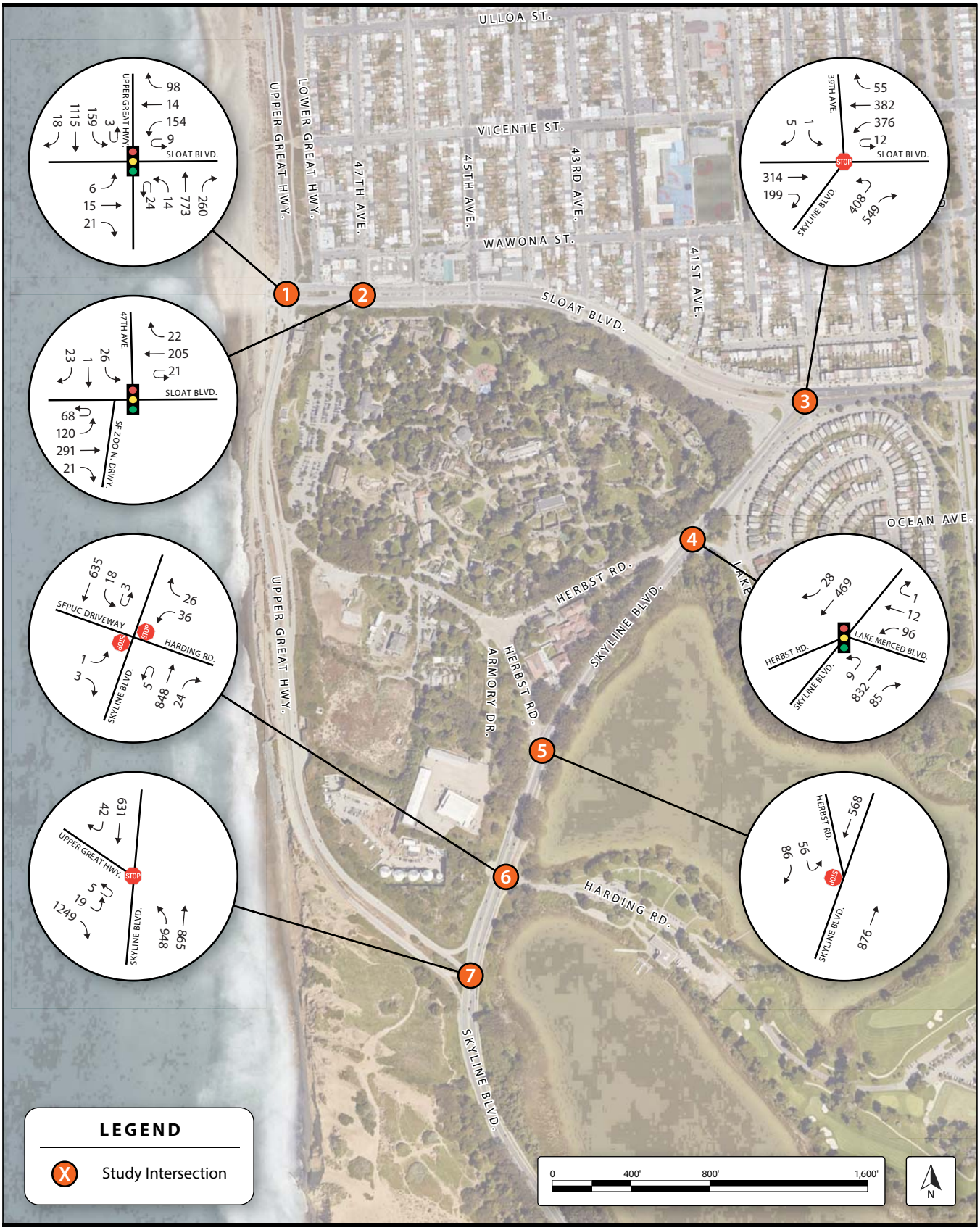
The Great Highway generally carries the highest traffic volumes in the project area with approximately 2,370 vehicles (1,300 southbound vehicles and 1,070 northbound vehicles at Sloat Boulevard) during the weekday PM peak hour, followed by Skyline Boulevard with approximately 1,430 vehicles (500 southbound vehicles and 930 northbound vehicles at Herbst Road North). Sloat Boulevard carries approximately 750 vehicles (500 eastbound vehicles and 250 westbound vehicles at 47$^{th}$ Avenue) during the PM peak hour. **Figure 4** presents the intersection turning movement volumes at the seven study intersections during the weekday PM peak hour.




South Ocean Beach Coastal Protection Project

Figure 3
Existing Intersection Lane Configurations

Consulting Group




South Ocean Beach Coastal Protection Project

Figure 4
Existing Intersection Turning Movement Counts
During Weekday PM Peak Hour

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**Weekday PM Peak Hour Intersection Operating Condition**

Traffic operational level of service (LOS) was evaluated at seven study intersections for the peak 60 minutes during the weekday PM peak period (4 to 6 PM). LOS is a qualitative description of an intersection's performance based on the average delay per vehicle. Intersection LOS range from LOS A, which indicates free flow conditions with minimal delays, to LOS F, which indicates congested conditions with considerably long delays.

Study intersections were evaluated using Synchro software and the Highway Capacity Manual (HCM) operations methodology for study intersections, except for the Skyline Boulevard/Herbst Road South and Skyline Boulevard/Great Highway intersections. These intersections were analyzed using the SimTraffic simulation model due to limitations of the Synchro software when coding unsignalized intersections.[2] LOS is calculated based on the average stopped delay per vehicle (seconds per vehicle) for the various approaches at the intersection. For signalized intersections, CHS incorporated current signal timing cards provided by the City of San Francisco and Caltrans.

**Table 2** shows the LOS and delay analysis results for the study intersections during the weekday PM peak hour under the Existing Condition. For signalized and all-way stop controlled intersections, the overall results represent a weighted average delay and LOS based on all intersection approaches. For unsignalized intersections (one- way and two-way stop controlled), delay and LOS for the worst stop-controlled approach is reported. It shows that all study intersections are currently operating at LOS D or better under the Existing Condition. Intersection LOS calculations are provided in **Appendix C**.

[2] Synchro treats an unsignalized intersection as an isolated intersection without accounting for a metering effect caused by the upstream signalized intersection. Using the SimTraffic simulation model to analyze Skyline Boulevard/Herbst Road South presents a more realistic operating condition for the minor approach (eastbound) with a controlled traffic flow from the upstream traffic in the southbound direction. The Skyline Boulevard/Great Highway intersection was also analyzed using SimTraffic because it has non-conforming geometry (e.g., channelized right-turn lane) which is not supported by HCM and Synchro overestimates delay when the volume on free-channelized right turn movement exceeds a certain amount.

## Table 2. Intersection Level of Service during Weekday PM Peak Hour

| Intersection | Control Type | Overall | | Eastbound | | Westbound | | Northbound | | Southbound | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| 1. Upper Great Highway / Sloat Boulevard | Signal | 35.6 | D | 50.5 | D | 35.3 | D | 33.5 | C | 36.9 | D |
| 2. Sloat Boulevard / 47th Avenue | Signal | 6.0 | A | 5.0 | A | 4.1 | A | - | - | 25.1 | C |
| 3. Sloat Boulevard / Skyline Boulevard | All-Way Stop | 13.2 | B | 9.2 | A | 13.3 | B | 9.5 | A | 9.5 | A |
| 4. Skyline Boulevard / Herbst Road North | Signal | 5.5 | A | - | - | 16.4 | B | 4.1 | A | 5.0 | A |
| 5. Skyline Boulevard / Herbst Road South[1] | One-Way Stop | 5.1 | A | 5.1 | A | - | - | 0.0 | - | 0.0 | - |
| 6. Skyline Boulevard / Harding Road | Two-Way Stop | 20.8 | C | 12.2 | B | 20.8 | C | 0.0 | - | 0.0 | - |
| 7. Skyline Boulevard / Great Highway | One-Way Stop | 15.6 | C | 10.9 | B | - | - | 22.1 | C | 14.6 | B |

Source: CHS Consulting Group, 2020.
Notes: LOS = level of service. Delay is reported as seconds per vehicle. For signalized and all-way stop controlled intersections, a weighted average delay and LOS based on all approaches is reported. For one- way and two-way stop controlled intersections, delay and LOS for the worst stop-controlled approach is reported.
1. During multiple field reviews (June 2019 and May 2020), eastbound vehicles making a right-turn onto Skyline Boulevard were observed to assume an exclusive right-turn lane due to 40-foot-wide lane. Therefore, the analysis assumed a dedicated eastbound right-turn lane at this intersection.

### Weekday PM Peak Hour Vehicle Queueing Condition

Detailed queuing analysis was conducted for the three signalized study intersections including Upper Great Highway/Sloat Boulevard, Sloat Boulevard/47th Avenue, and Skyline Boulevard/Herbst Road North intersections. At the intersection of Upper Great Highway/Sloat Boulevard, the maximum vehicle queues at the westbound approach extend beyond the Sloat Boulevard/Lower Great Highway intersection due to approximately 160 vehicles turning left onto Great Highway during the PM peak hour. There were no significant queues for the vehicles turning right (approximately 100 vehicles) onto Great Highway. These results are consistent with vehicle queues observed at the westbound approach that occasionally creates obstructions to Lower Great Highway traffic trying to access Sloat Boulevard. No other signalized intersections were observed to have vehicle queues extending beyond the roadway segment storage capacity such that they would obstruct traffic flow on adjacent roadway segments.

### 2.2.2 Weekday PM Peak Hour Bicycle Volumes

**Table 3** presents the peak 60-minute bicycle volumes during the PM peak period (4 to 6 PM) at the seven study intersections. Bicycle volumes in the project area range from three to 19 during the PM peak hour. The highest bicycle volumes (19 bicyclists) were observed at the intersection of Sloat and Skyline boulevards.

**Table 3. Bicycle Volumes during Weekday PM Peak Hour**

| Intersection | East bound | West bound | North bound | South bound | Total |
|---|---|---|---|---|---|
| 1. Upper Great Highway/Sloat Boulevard | 0 | 3 | 1 | 9 | 13 |
| 2. Sloat Boulevard/47th Avenue | 4 | 5 | - | 2 | 11 |
| 3. Sloat Boulevard/Skyline Boulevard | 5 | 9 | 5 | - | 19 |
| 4. Skyline Boulevard/Herbst Road North | - | 2 | 2 | 2 | 6 |
| 5. Skyline Boulevard/Herbst Road South | 1 | - | 1 | 2 | 4 |
| 6. Skyline Boulevard/Harding Road | 0 | 0 | 1 | 2 | 3 |
| 7. Skyline Boulevard/Great Highway | 4 | - | 2 | 2 | 8 |

Source: CHS Consulting Group, 2019.

### 2.2.3 Weekday PM Peak Hour Pedestrian Volumes

**Table 4** presents the peak 60-minute pedestrian crossings during the PM peak period (4 to 6 PM) at the seven study intersections. The highest pedestrian volumes were observed at the Sloat Boulevard/47th Avenue intersection with 104 pedestrian crossings during the PM peak hour. Pedestrian volumes in the project area are generally low, except for the west leg of the Sloat Boulevard/47th Avenue intersection, which connects to the SF Zoo entrance on Sloat Boulevard.

**Table 4. Pedestrian Volumes during Weekday PM Peak Hour**

| Intersection | East Leg | West Leg | North Leg | South Leg | Total |
|---|---|---|---|---|---|
| 1. Great Highway/Sloat Boulevard | 1 | 2 | 4 | 5 | 12 |
| 2. Sloat Boulevard/47th Avenue | 24 | 63 | 14 | 3 | 104 |
| 3. Sloat Boulevard/Skyline Boulevard | 2 | 10 | 15 | 11 | 38 |
| 4. Skyline Boulevard/Herbst Road North | - | 16 | 8 | 18 | 42 |
| 5. Skyline Boulevard/Herbst Road South | - | 0 | 1 | 3 | 4 |
| 6. Skyline Boulevard/Harding Road | 58 | 1 | 2 | 0 | 61 |
| 7. Skyline Boulevard/Great Highway | - | 0 | 0 | 0 | 0 |

Source: CHS Consulting Group, 2019.

### 2.2.4 Weekday PM Peak Hour SF Zoo Visitor Trips

SF Zoo has two gates, including the Sloat Boulevard gate and the Great Highway gate. Multimodal counts were collected at these locations during the weekday PM peak period (4 to 6 PM) on Tuesday, July 9, 2019.

**Table 5** shows multimodal visitor trips collected at both gates during the peak 60-minute period, which occurred from 4 to 5 PM. There were a total of 51 inbound and 183 outbound vehicle trips during the peak hour. There were approximately 100 pedestrian crossings at the Sloat Boulevard/47th Street intersection and no pedestrians at the Great Highway gate. There were no bicycle trips at either gate.

### Table 5. SF Zoo Visitor Trips during Weekday PM Peak Hour

| Gate | Vehicle Trips | | Bicycle Trips | | Pedestrian Trips | |
|---|---|---|---|---|---|---|
| | Inbound | Outbound | Inbound | Outbound | Inbound | Outbound |
| Sloat Boulevard | 21 | - | 0 | 0 | < 104[1] | |
| Great Highway | 30 | 183 | 0 | 0 | 0 | 0 |
| **Total** | **51** | **183** | **0** | **0** | **<104** | |

Source: CHS Consulting Group, 2019.
Notes:
1. Includes pedestrian crossings in the east, west, and south crosswalks at the Sloat Boulevard/47th Avenue intersection; however, these volumes include pass-by pedestrians who may not enter or exit from the SF Zoo.

## 2.3 Weekend Midday Peak Period (Phase II)

Based on the feedback received from SF Zoo, and in consultation with San Francisco Planning Department staff, CHS collected multimodal counts at four study intersections listed below, on Saturday, July 27, 2019 and Saturday, October 26, 2019 during the peak zoo traffic period between 12 and 4 PM. Detailed vehicle, bicycle, and pedestrian data sheets are provided in **Appendix B**.

1. Upper Great Highway/Sloat Boulevard (Saturday, July 27, 2019)
2. Sloat Boulevard/47th Avenue (Saturday, July 27, 2019)
3. Skyline Boulevard/Herbst Road North (Saturday, October 26, 2019)
4. Skyline Boulevard/Herbst Road South (Saturday, October 26, 2019)

CHS also conducted in-person intercept surveys at the SF Zoo on two Sundays (June 30, 2019 and July 4, 2019) to determine Zoo visitor mode splits and vehicle occupancy rates. On-street parking surveys were conducted concurrently with the SF Zoo intercept survey to determine existing parking supply and utilization within the project area.

### 2.3.1 Weekend Midday Peak Hour Traffic Operation

#### Weekend Midday Peak Hour Traffic Volumes

The Great Highway generally carries the highest traffic volumes in the project area, with approximately 2,140 vehicles (940 southbound vehicles and 1,200 northbound vehicles at Sloat Boulevard) during the weekday PM peak hour, followed by Skyline Boulevard with approximately 1,440 vehicles (490 southbound vehicles and 950 northbound vehicles at Herbst Road North). Sloat Boulevard carries approximately 1,010 vehicles (440 eastbound vehicles and 570 westbound vehicles at Skyline Boulevard during the PM peak hour. **Figure 5** presents the intersection turning movement volumes at the four study intersections during the weekend midday peak hour.


South Ocean Beach Coastal Protection Project

Figure 5
Existing Intersection Turning Movement Counts
During Weekend Midday Peak Hour

### Weekend Midday Peak Hour Intersection Operating Condition

Traffic operational LOS was evaluated at four study intersections for the peak 60-minutes during the weekend midday peak period (12 to 4 PM). Similar to the weekday traffic analysis, the study intersections were evaluated using Synchro software and HCM operations methodology, except for the Skyline Boulevard/Herbst Road South intersection. The Skyline Boulevard/Herbst Road South intersection was analyzed using the SimTraffic simulation model due to limitations of Synchro software when coding unsignalized intersections. LOS is calculated based on the average stopped delay per vehicle (seconds per vehicle) for the various approaches at the intersection. For signalized intersections, CHS incorporated current signal timing cards provided by the City of San Francisco and Caltrans.

**Table 6** shows the LOS and delay analysis results for the study intersections during the weekend midday peak hour under the Existing Condition. For signalized and all-way stop controlled intersections, the overall results represent a weighted average delay and LOS based on all intersection approaches. For unsignalized intersections (one- way and two-way stop controlled), delay and LOS for the worst stop-controlled approach is reported. It shows that all study intersections are currently operating at LOS D or better under the Existing Condition. Intersection LOS calculations are provided in **Appendix C**.

## Table 6. Intersection Level of Service during Weekend Midday Peak Hour

| Intersection[1] | Control Type | Overall | | Eastbound | | Westbound | | Northbound | | Southbound | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| 1. Upper Great Highway/ Sloat Boulevard | Signal | 39.3 | D | 50.6 | D | 35.6 | D | 41.7 | D | 37.5 | D |
| 2. Sloat Boulevard/ 47th Avenue | Signal | 6.2 | A | 5.0 | A | 4.8 | A | | | 24.1 | C |
| 4. Skyline Boulevard/ Herbst Road North | Signal | 5.8 | A | | | 16.0 | B | 4.7 | A | 5.3 | A |
| 5. Skyline Boulevard/ Herbst Road South[2] | One-Way Stop | 5.5 | A | 5.5 | A | | | 0.0 | - | 0.0 | - |

Source: CHS Consulting Group, 2020.

Notes: Notes: LOS = level of service. Delay is reported as seconds per vehicle. For signalized and all-way stop controlled intersections, a weighted average delay and LOS based on all approaches is reported. For one- way and two-way stop controlled intersections, delay and LOS for the worst stop-controlled approach is reported.

1. Intersections #3, #6, #7 were analyzed for the weekday PM peak hour condition only (see Table 3).
2. During multiple field reviews (June 2019 and May 2020), eastbound vehicles making a right-turn onto Skyline Boulevard were observed to assume an exclusive right-turn lane due to a 40-foot-wide lane. Therefore, the analysis assumed a dedicated eastbound right-turn lane at this intersection.

### Weekend Midday Peak Hour Vehicle Queueing Condition

Detailed queuing analysis was conducted for the three signalized study intersections including Upper Great Highway/Sloat Boulevard, Sloat Boulevard/47th Avenue, and Skyline Boulevard/Herbst Road North intersections. At the intersection of Upper Great Highway/Sloat Boulevard, the maximum vehicle queues at the westbound approach is longer than the weekday condition by approximately one-car length and extends beyond the Sloat Boulevard/Lower Great Highway intersection. These results are consistent with

vehicle queues observed at the westbound approach that occasionally create obstructions to Lower Great Highway traffic trying to access Sloat Boulevard. No other signalized intersections were observed to have vehicle queues extending beyond the roadway segment storage capacity such that they would obstruct traffic flow on adjacent roadway segments.

### 2.3.2 Weekend Midday Peak Hour Bicycle Volumes

**Table 7** presents the peak 60-minute bicycle volumes during the weekend midday peak period (12 to 4 PM) at the four study intersections. Bicycle volumes in the project area range from 11 to 35 during the weekend midday peak hour. The highest bicycle volumes (35 bicyclists) were observed at the intersection of Upper Great Highway and Sloat Boulevard.

**Table 7. Bicycle Volumes during Weekend Midday Peak Hour**

| Intersection | East bound | West bound | North bound | South bound | Total |
|---|---|---|---|---|---|
| 1. Upper Great Highway/Sloat Boulevard | 8 | 6 | 9 | 10 | 35 |
| 2. Sloat Boulevard/47th Avenue | 13 | 12 | - | 2 | 27 |
| 4. Skyline Boulevard/Herbst Road North | - | 1 | 2 | 13 | 16 |
| 5. Skyline Boulevard/Herbst Road South | 1 | - | 4 | 6 | 11 |

Source: CHS Consulting Group, 2019.

### 2.3.3 Weekend Midday Peak Hour Pedestrian Volumes

**Table 8** presents the peak 60-minute pedestrian crossings during the weekend midday peak period (12 to 4 PM) at the four study intersections. The highest pedestrian volumes were observed at the Sloat Boulevard/47th Avenue intersection with 252 pedestrian crossings during the weekend midday peak hour. High pedestrian levels at this intersection could be attributed to its proximity to the SF Zoo's entrance on Sloat Boulevard and the beach.

**Table 8. Pedestrian Volumes during Weekend Midday Peak Hour**

| Intersection | East Leg | West Leg | North Leg | South Leg | Total |
|---|---|---|---|---|---|
| 1. Upper Great Highway/Sloat Boulevard | 3 | 27 | 37 | 25 | 92 |
| 2. Sloat Boulevard/47th Avenue | 28 | 144 | 38 | 42 | 252 |
| 4. Skyline Boulevard/Herbst Road North | - | 16 | 0 | 17 | 33 |
| 5. Skyline Boulevard/Herbst Road South | - | 0 | 0 | 1 | 1 |

Source: CHS Consulting Group, 2019.

### 2.3.4 Weekend Midday Peak Hour SF Zoo Visitor Trips

#### Weekend Midday Peak Hour SF Zoo Visitor Volumes

Multimodal counts were collected at the SF Zoo's two gates (Sloat Boulevard gate and the Great Highway gate) during the weekend midday peak period (12 to 4 PM) on Saturday, July 27, 2019. **Table 9** shows multimodal visitor trips collected at both gates during the peak 60-minute period, which occurred from 12:15 to 1:15 PM. There were a total of 241 inbound and 185 outbound vehicle trips during the peak hour. Approximately 50 pedestrians entered or exited the zoo through the Great Highway gate. There were approximately 250 pedestrian crossings at the Sloat Boulevard/47th Street intersection. There was one bicycle trip.

**Table 9. SF Zoo Visitor Trips during Weekend Midday Peak Hour**

| Gate | Vehicle Trips | | Bicycle Trips | | Pedestrian Trips | |
|---|---|---|---|---|---|---|
| | Inbound | Outbound | Inbound | Outbound | Inbound | Outbound |
| Sloat Boulevard | 63 | - | 0 | 0 | < 252[1] | |
| Great Highway | 178 | 185 | 1 | 0 | 41 | 9 |
| Total | 241 | 185 | 1 | 0 | <302 | |

Source: CHS Consulting Group, 2019.
Notes:
1. Includes pedestrian crossings in the east, west, and south crosswalks at the Sloat Boulevard/47th Avenue intersection; however, these volumes include pass-by pedestrians who may not enter or exit from the SF Zoo.

#### Weekend Midday Peak Hour SF Zoo Visitor Travel Patterns

CHS conducted in-person intercept surveys at the SF Zoo on two Sundays (June 30th and July 14th, 2019) to determine visitors' mode split and vehicle occupancy rates. The first Sunday intercept survey was conducted between 10:00 AM and 3:00 PM. Based on the first day results, it was determined that the peak SF Zoo visitor trips generally occurred later in the afternoon. Therefore, CHS conducted the second Sunday intercept survey between 12:00 PM and 5:00 PM, to obtain more survey responses during the peak of SF Zoo visitation. The intercept survey was conducted within the ticketing plaza adjacent to the SF Zoo parking lot. Survey questionnaires, including the following three questions, were given to exiting zoo visitors at random.

1. How many adults and children are in their group?
2. What is the mode of transportation taken to get to the zoo?
3. If drove, where did they park the vehicle?

CHS collected a total of 548 responses. The SF Zoo intercept survey results are presented in **Table 10**. The intercept survey instrument is provided in **Appendix D**.

## Table 10. SF Zoo Visitor Travel Patterns during Weekend Midday Peak Period

| Question | Number of Responses | Percent | Average Group Size[1] | Number of Adults | Number of Children | Total Visitors |
|---|---|---|---|---|---|---|
| **Mode Choice** | **548** | **100%** | **3.44** | **1,110** | **776** | **1,886** |
| I Drove Myself | 453 | 83% | 3.54 | 938 | 665 | 1,603 |
| I Took Muni Bus/Rail | 41 | 7% | 3.54 | 79 | 66 | 145 |
| Dropped Off | 42 | 8% | 2.60 | 73 | 36 | 109 |
| Bicycle | 0 | 0% | 0.00 | 0 | 0 | 0 |
| Walk | 12 | 2% | 2.42 | 20 | 9 | 29 |
| **Parking Location** | **453** | **100%** | **3.54** | **940** | **665** | **1,605** |
| SF Zoo Parking Lot | 260 | 57% | 3.63 | 575 | 371 | 946 |
| Street Parking Outside SF Zoo | 193 | 43% | 3.42 | 365 | 294 | 659 |
| Other Lot(s) | 0 | 0% | 0.00 | 0 | 0 | 0 |
| **Dropped Off – How** | **42** | **100%** | **2.60** | **73** | **36** | **109** |
| Uber/Lyft | 33 | 78% | 2.54 | 60 | 22 | 84 |
| Taxi | 2 | 5% | 3.50 | 4 | 3 | 7 |
| Personal Vehicle | 7 | 17% | 2.86 | 9 | 11 | 20 |

Source: CHS Consulting Group, 2019.

Notes: Survey results show the combined total from July 30th and July 14th, 2019.

1. Average group size equals the total number of adults and children divided by the number of responses.

As shown in **Table 10**, approximately 83 percent of respondents (453 responses) drove, seven percent arrived by public transit (Muni), eight percent were dropped-off, two percent walked, and no respondents arrived by bicycle. The average group size is approximately 3.5 persons per vehicle (including adults and children). Of the respondents who drove, 57 percent parked at the SF Zoo parking lot, 43 percent parked on the streets outside of the zoo, and no one parked at other off-site parking lots. Of the 42 people who said they were dropped-off, 78 percent arrived via Uber/ Lyft, five percent arrived via taxi, and 17 percent were dropped-off by a personal vehicle.

### 2.3.5 Weekend Midday Peak Hour Parking Condition

To determine the existing parking supply and utilization within the project area, CHS conducted a parking supply and occupancy survey concurrently with the SF Zoo intercept surveys on the two Sundays, June 30, 2019 and July 14, 2019, during the same hours (12 and 4 PM). These weekends represent the peak parking conditions, visitor demand is generally higher during the summer months for the SF Zoo and the beach. [3]

[3] Weather conditions on June 30th, 2019 were approximately 63 degrees with overcast skies and winds up to 17 miles per hour (mph), and on July 14th, 2019 were approximately 66 degrees with partly cloudy skies and winds up to 17 mph.

Parking survey area was subdivided into the following six Sub-areas (see **Figure 6**). The Sub-areas are defined as follows:

- **Sub-area 1A** – curbside and median on-street parking along Sloat Boulevard between Upper Great Highway and Skyline Boulevard, 305 marked parking spaces.
- **Sub-area 1B** – off-street parking lot at the southwest corner of the Sloat/Skyline intersection. 107 marked parking spaces and 75 unmarked parking spaces, for a total 182 parking spaces.
- **Sub-area 2** – on-street parking along Lower Great Highway between Sloat Boulevard and Cutler Avenue, 37 marked parking spaces.
- **Sub-area 3** – on-street parking along the northern segment of Herbst Road, 151 marked parking spaces.
- **Sub-area 4** – on-street parking along the southern segment of Herbst Road, 111 marked parking spaces.
- **Sub-area 5A** – shoreline parking along Great Highway between Sloat and Skyline Boulevards, 85 unmarked parking spaces.
- **Sub-area 5B** – median parking along Great Highway between Sloat and Skyline Boulevards, 115 unmarked parking spaces.
- **Sub-area 6** –Golden Gate National Park parking lot located at the west leg of the intersection of Sloat Boulevard and Great Highway (2801 Great Highway), which has 28 marked parking spaces and seven unmarked parking spaces for a total supply of 35 parking spaces.

A total of 1,021 parking spaces were identified within the project area, excluding the SF Zoo's onsite parking lot. [4] It is noted that approximately 200 of these spaces (in Sub-areas 5A and 5B) have been removed since data collection.

Peak hour parking supply and occupancy results for parking spaces are provided in **Table 11**, and further illustrated in **Figure 6**. Detailed parking occupancy survey data are provided in **Appendix E**. It shows that the sub-areas with the highest parking occupancy rate are located nearest the SF Zoo entrance or Ocean Beach. Herbst Road has the lowest parking occupancy rates, with three percent occupancy rate along the north side of Herbst Road (Sub-area 3) and 10 percent occupancy rate along the south side of Herbst Road (Sub-area 4). The parking lot located at the southwest corner of the Sloat and Skyline boulevards intersection also had low parking occupancy (14 percent).

[4] Approximately nine on-street parking spaces on the north side of Sloat Boulevard, between 46th and 47th Avenues were unavailable during both survey days due to construction activities.

## Table 11. Parking Occupancy Rates during Weekend Midday Peak Hour

| Sub Area | Peak Hour | Supply[1] | | | | | Occupancy | |
|---|---|---|---|---|---|---|---|---|
| | | Marked | Un-marked | Time Limited | ADA | Total | Spaces | Percent |
| 1A. Sloat Boulevard | 2 PM | 275 | 0 | 14 | 9 | 298[1] | 242 | 81% |
| 1B. Sloat/Skyline Parking Lot | 2 PM | 107 | 75 | 0 | 0 | 182 | 26 | 14% |
| 2. Lower Great Highway | 12 PM | 37 | 0 | 0 | 0 | 37 | 36 | 97% |
| 3. Herbst Road North | 3 PM | 141 | 0 | 0 | 10 | 151 | 5 | 3% |
| 4. Herbst Road South | 1 PM | 107 | 0 | 0 | 4 | 111 | 11 | 10% |
| 5A. Great Highway Shoreline[2] | 2 PM | 0 | 85 | 0 | 0 | 85 | 39 | 46% |
| 5B. Great Highway Median[2] | 2 PM | 0 | 115 | 0 | 0 | 115 | 42 | 37% |
| 6. Golden Gate National Park Parking Lot | 1 PM | 26 | 7 | 0 | 2 | 35 | 32 | 91% |
| **Total** | | **693** | **282** | **14** | **25** | **1,014** | **433** | **43%** |

Source: CHS Consulting Group, 2019.

Notes:

1. Unmarked parallel parking supply estimated by dividing the measured length of available parking by 20-feet per space, while all other unmarked off-street parking supply estimated by dividing the measured usable surface area by an average 350 square-feet per space

2. Parking spaces in Sub-areas 5A and 5B have been removed since data collection


SFPUC South Ocean Beach Traffic Study

Consulting Group

Figure 6
Parking Occupancy Rates By Sub Area

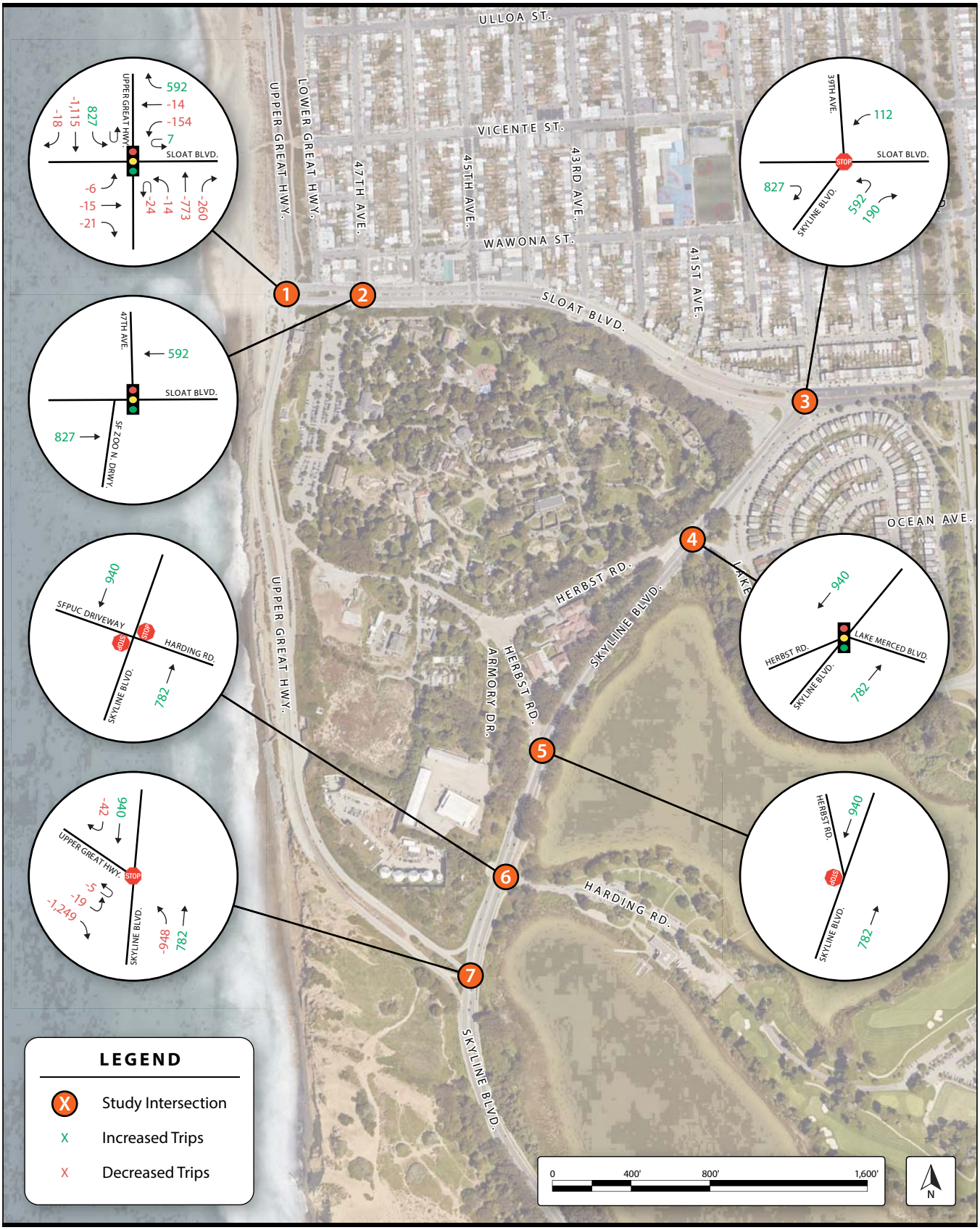
# 3.0 Future Traffic Volumes

The proposed project involves converting a segment of Great Highway into a multi-purpose path for pedestrians and bicyclists and modifying access to and from the SF Zoo's parking lot. Therefore, the proposed project would not generate any new permanent trips but affect traffic circulation in the project area. The proposed project would result in diversion of the existing traffic on Great Highway and redistribute the SF Zoo traffic on Sloat and Skyline boulevards. Methodology and assumptions for estimating diverted trips and the SF Zoo trips on Sloat and Skyline boulevards are described here.

## 3.1 Diverted Trips

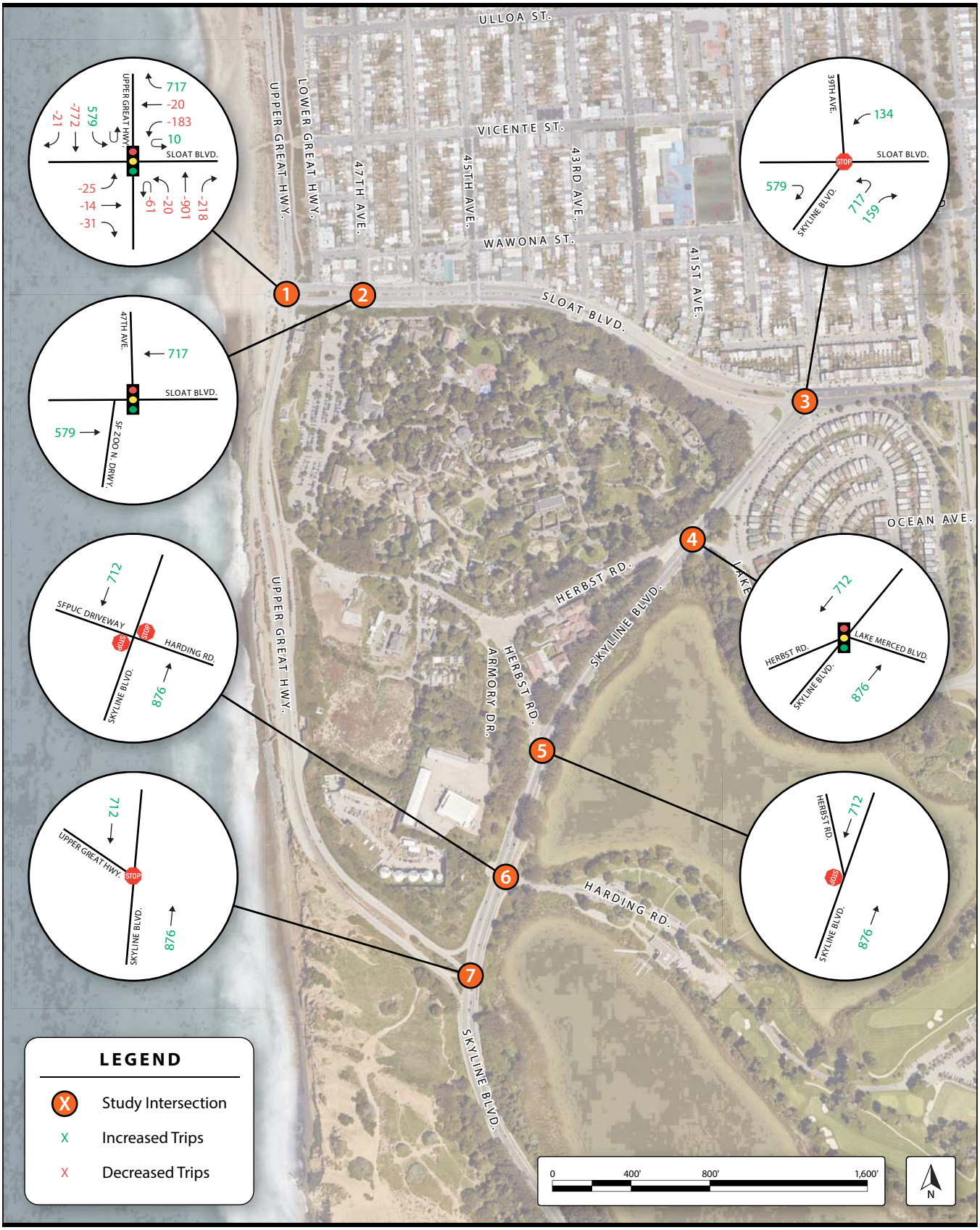
The proposed project would close Great Highway between Sloat and Skyline boulevards to vehicular traffic in both directions. The intersection of Great Highway and Sloat Boulevard would become a signalized "L" shaped intersection. As a result, southbound traffic on Upper Great Highway would be forced to make a left-turn onto Sloat Boulevard, and northbound traffic on Great Highway coming from Skyline Boulevard would continue to travel north on Skyline Boulevard, turn left on Sloat Boulevard, and then turn right onto Upper Great Highway.

In order to estimate the level of diversion from Great Highway in the future, CHS collected traffic counts at three study intersections (i.e., Upper Great Highway/Sloat Boulevard, Sloat Boulevard/Skyline Boulevard, and Skyline Boulevard/Great Highway) on Tuesday, February 4, 2020 when the southbound lanes of Great Highway between Sloat and Skyline boulevards were closed due to sand buildup. **Appendix B** includes traffic counts collected on February 4, 2020. Approximately 27 percent of the existing southbound traffic on Upper Great Highway diverted to other parallel streets (e.g., Sunset Boulevard and 19$^{th}$ Avenue) and about 73 percent of the existing southbound volume was observed to be making left-turns onto Sloat Boulevard. Therefore, the traffic analysis for the proposed project assumed that approximately 27 percent of the existing traffic on Great Highway would use other parallel streets such as Sunset Boulevard or 19$^{th}$ Avenue in both directions. The remaining 73 percent of the existing traffic was assumed to use Skyline and Sloat boulevards in both directions. For southbound traffic, vehicles were assumed to make left-turns onto Sloat Boulevard and then right-turns onto Skyline Boulevard to continue to south. Likewise, northbound traffic was assumed to continue to travel north on Skyline Boulevard, turn left onto Sloat Boulevard, and then turn right onto Upper Great Highway to continue to north. **Figure 7** presents the weekday PM peak hour and **Figure 8** presents the weekend midday peak hour changes in traffic volumes at study intersections due to the closure of Great Highway. **Appendix F** includes a detailed volume spreadsheet for diverted traffic.




South Ocean Beach Coastal Protection Project

Figure 7
Diverted Traffic Volumes During Weekday PM Peak Hour




South Ocean Beach Coastal Protection Project

Figure 8
Diverted Traffic Volumes During Weekend Midday Peak Hour

## 3.2 SF Zoo Trips

The SF Zoo currently generates approximately 234 vehicle trips during the weekday PM peak hour and 426 vehicle trips during the weekend midday peak hour (see **Tables 6 and 9**). The number of visitors to the SF Zoo is expected to remain the same as the Existing Condition since there would be no new exhibits or attractions. However, there would be increased vehicle trips at the SF Zoo's driveways because the SF Zoo would add parking meters or the equivalent in its parking lot to accommodate a portion of displaced coastal parking demand due to the closure of Great Highway.

Based on the parking survey conducted on Sunday, June 30, 2019 (**Figure 6**), there were approximately 113 vehicles parked in the median of Great Highway and the GGNRA lot during the weekend midday peak period. These vehicles would be displaced when the Great Highway fully closes. Approximately 50 of these vehicles would be accommodated at a new parking lot proposed by San Francisco Parks and Recreation near the closed portion of Great Highway.[5] The SF Zoo would accommodate the remaining 63 vehicles by adding parking meters or the equivalent in the SF Zoo parking lot. These vehicles could increase vehicle trips at the SF Zoo driveways by up to 63 trips during the peak hour. Assuming the same inbound and outbound splits of the zoo patrons during the weekend midday peak hour, vehicle trips would increase by up to 36 trips in the inbound direction and 28 trips in the outbound direction. While coastal parking demand tends to be higher on weekends than weekdays, for the purpose of conservative analysis, the same level of traffic increase (63 trips) is assumed for the weekday PM peak hour.

The SF Zoo's parking lot is currently accessed via eastbound Sloat Boulevard or northbound Great Highway, and all exiting vehicles use the northbound Great Highway. In addition, employee and delivery vehicles are allowed to use the gate on Zoo Road. The proposed project would close the Great Highway gate and change access to the SF Zoo as follows:

- **Project Variant #1** – All vehicles would enter and exit through the Sloat Boulevard gate. Zoo Road gate would remain open to employees and deliveries only.
- **Project Variant #2** – Vehicles would enter and exit through the Sloat Boulevard gate and Zoo Road gate. The same split between the existing vehicles entering the Sloat Boulevard vs. Great Highway gates was used to estimate the number of vehicles exiting onto Sloat Boulevard and Zoo Road.
- **Project Variant #3** – Vehicles would enter through the Sloat Boulevard gate and Zoo Road gate. All exiting vehicles would use eastbound Sloat Boulevard. Zoo Road gate would remain open to employees and deliveries in both directions. The same split between exiting vehicles entering the Sloat Boulevard vs. Great Highway gates was used to estimate the number of vehicles entering from Sloat Boulevard and Zoo Road.
- **Project Variant #4** –Vehicles would enter through the Sloat Boulevard gate and a one-way northbound service road that connects from Skyline Boulevard to Zoo Road. All exiting vehicles would use a one-way northbound service road that connects to Sloat Boulevard. Zoo Road gate would remain open to employees and deliveries only. The same number of vehicles currently using

[5] For the purpose of traffic analysis, the SF Parks and Rec parking lot was assumed to generate 50 vehicle trips (28 inbound trips and 22 outbound trips) during the weekday and weekend peak hour.

the Great Highway gate was assumed to use the one-way service road that connects from Skyline Boulevard to Sloat Boulevard.

- **Program Variant** –All vehicles using the VIP parking lot would enter and exit through the Sloat Boulevard gate only. All vehicles using the new parking facility would enter and exit through the Zoo Road gate only. The percentages of parking stalls provided in the VIP parking lot and the new parking facility were used to distribute trips between the Sloat Boulevard and Zoo Road gates.

**Table 12** presents the summary of inbound and outbound vehicle trips the SF Zoo gates under each project and program variant. **Figure 9** also presents the traffic volumes at the SF Zoo gates under each project and program variant. **Appendix F** includes detailed estimation of SF Zoo trips.

## Table 12. SF Zoo Vehicle Trips

| Scenario | Gate | Weekday PM Peak Hour | | Weekend Midday Peak Hour | |
|---|---|---|---|---|---|
| | | Inbound | Outbound | Inbound | Outbound |
| **Existing** | Sloat Boulevard | 21 | 0 | 63 | 0 |
| | Great Highway | 30 | 183 | 178 | 185 |
| **Project Variant #1** | Sloat Boulevard | 87 | 210 | 277 | 212 |
| | Zoo Road | 0 | 0 | 0 | 0 |
| **Project Variant #2** | Sloat Boulevard | 36 | 87 | 72 | 56 |
| | Zoo Road | 51 | 124 | 204 | 157 |
| **Project Variant #3** | Sloat Boulevard | 36 | 210 | 72 | 212 |
| | Zoo Road | 51 | 0 | 204 | 0 |
| **Project Variant #4** | Sloat Boulevard | 36 | 0 | 72 | 0 |
| | Zoo Road | 51 | 210 | 204 | 212 |
| **Program Variant** | Sloat Boulevard | 13 | 45 | 60 | 46 |
| | Zoo Road | 74 | 165 | 217 | 167 |

Source: CHS Consulting Group, 2020.

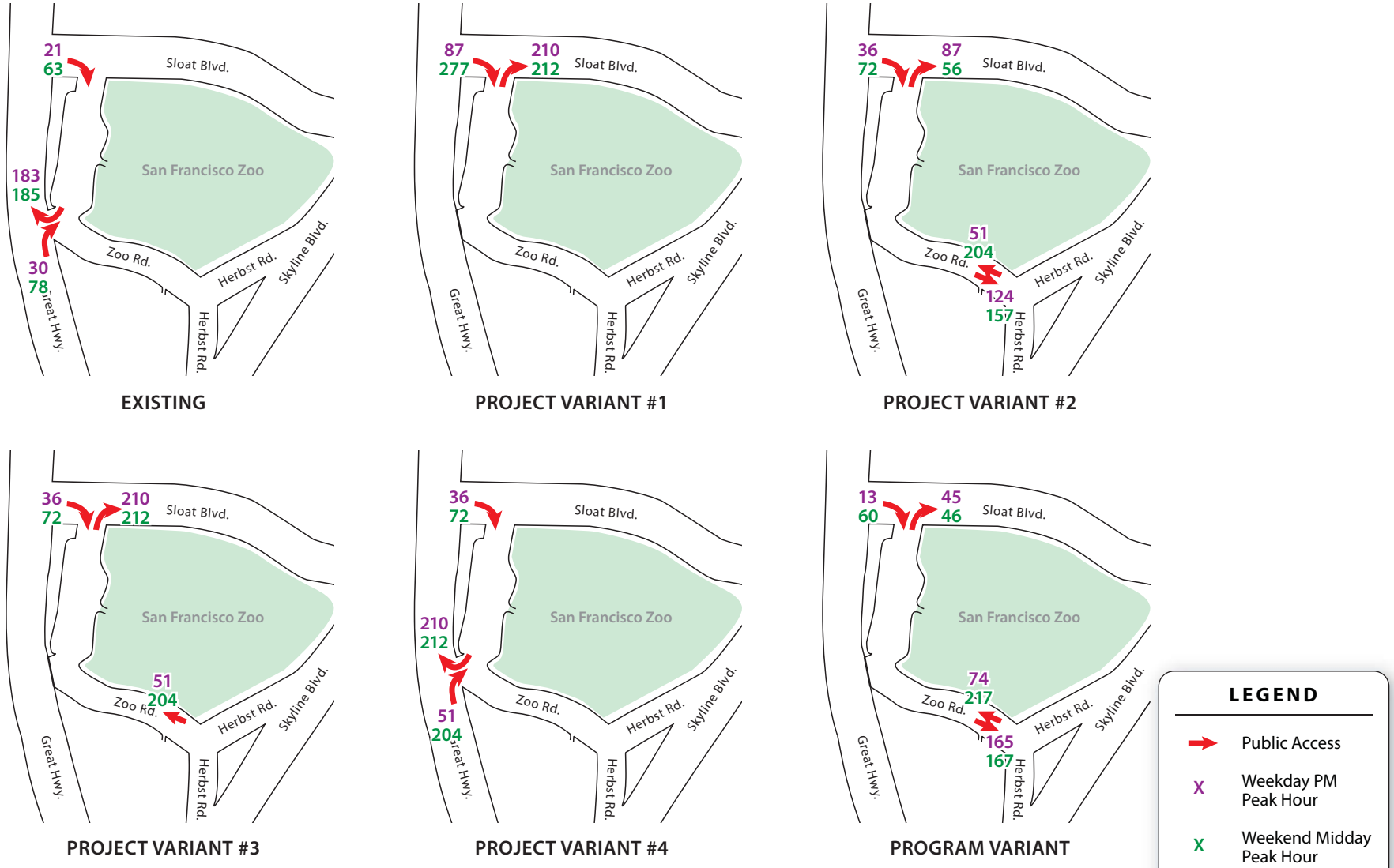



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Figure 9
San Francisco Zoo Parking Trips Under Existing Plus Project Conditions

# 4.0 Existing plus Project Conditions

## 4.1 Weekday PM Peak Hour

Traffic operational LOS was evaluated at the seven study intersections for the peak 60-minutes during the weekday PM peak period (4 to 6 PM) under the Existing plus Project Conditions. **Figure 10** presents the weekday PM peak hour traffic volumes for Existing plus Project Conditions. Study intersections were evaluated using Synchro software and the HCM operations methodology, except for the Skyline Boulevard/Herbst Road South and Skyline Boulevard/Great Highway intersections. These intersections were analyzed using the SimTraffic simulation model due to limitations of Synchro software coding unsignalized intersections.[6]

**Table 13** shows the summary of LOS and delay analysis results during the weekday PM peak hour under each project and program variant. It also includes the Existing plus Great Highway Closure scenario without any changes in zoo access. This hypothetical scenario is included for comparison purposes only, to understand whether the changes are caused by diverted trips vs. SF Zoo trips. Detailed intersection LOS calculations including movement delays are provided in **Appendix C**. The following intersections would operate at LOS E or F under the Existing plus Project Conditions:

- **#3 Sloat Boulevard/Skyline Boulevard** would operate at LOS F under all future scenarios, mainly due to increased traffic volumes along Sloat and Skyline boulevards with the diverted traffic from Great Highway. This intersection would operate at LOS F regardless of the changes in SF Zoo trip distribution. This intersection is currently stop-controlled at all approaches, and would increase delays in the northbound left-turn movement as its volumes would increase from approximately 400 to 1,050 vehicles. Signalizing this intersection would improve the operating condition to LOS B.
- **#6 Skyline Boulevard/Harding Road** would operate at LOS F under all future scenarios, mainly because westbound vehicles (approximately 36 vehicles) on Harding Road would not be able to find an adequate gap in the increased northbound traffic (approximately 1,700 vehicles) to make a left-turn onto the southbound merge lane on Skyline Boulevard. Restriping the westbound lane with a 120-foot-long exclusive left-turn lane would slightly reduce the delay, but the approach delay would remain at LOS F.

Caltrans plans to signalize the Skyline Boulevard/Great Highway intersection, located approximately 500-feet south of the Skyline Boulevard/Harding Road intersection. When a metering effect from signalizing the Skyline Boulevard/Great Highway intersection is assumed along with a 120-foot-long exclusive left-turn

[6] Synchro treats an unsignalized intersection as an isolated intersection without accounting for a metering effect caused by the upstream signalized intersection. Using the SimTraffic simulation model to analyze the Skyline Boulevard/Herbst Road South presents a more realistic operating condition for the minor approach (eastbound) with a controlled traffic flow from the upstream traffic in the southbound direction. The Skyline Boulevard/Great Highway intersection was also analyzed using the SimTraffic because it has non-conforming geometry (e.g., channelized right-turn lane) which is not supported by HCM, and Synchro overestimates delays when the volume on free-channelized right turn movement exceeds a certain amount.

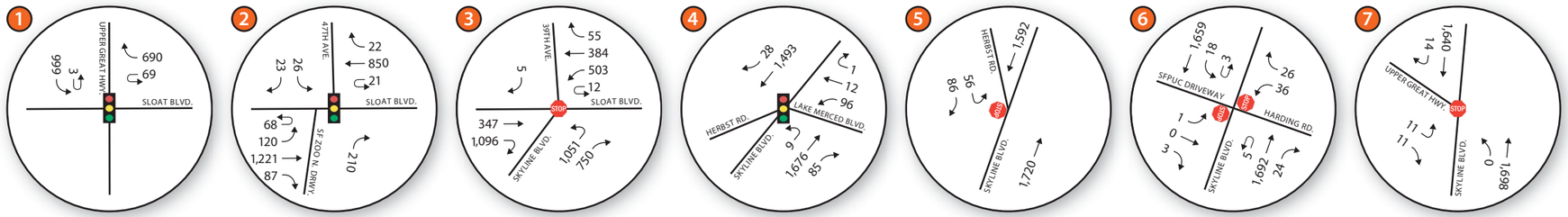

**LEGEND**

X Study Intersection

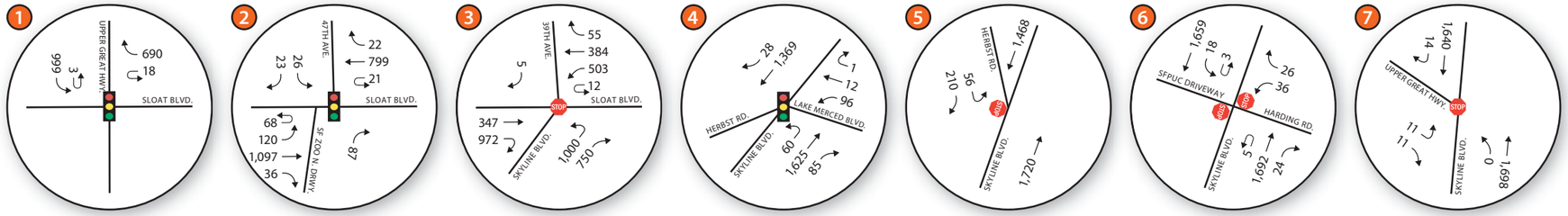
N

0 400' 800' 1,600'

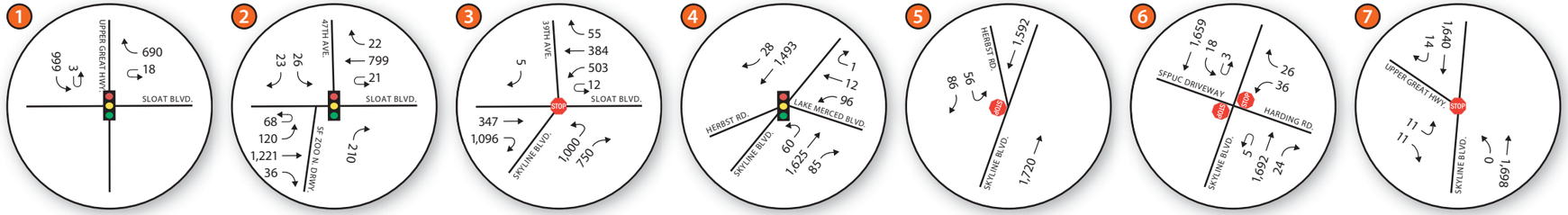
## Project Variant #1



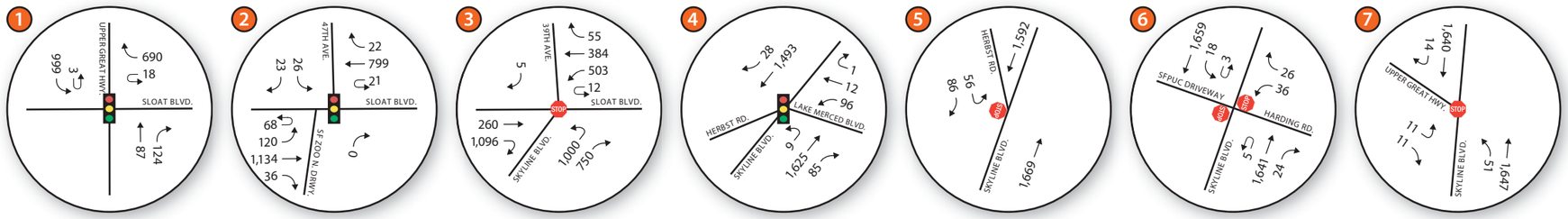

## Project Variant #2




## Project Variant #3




## Project Variant #4




## Program Variant

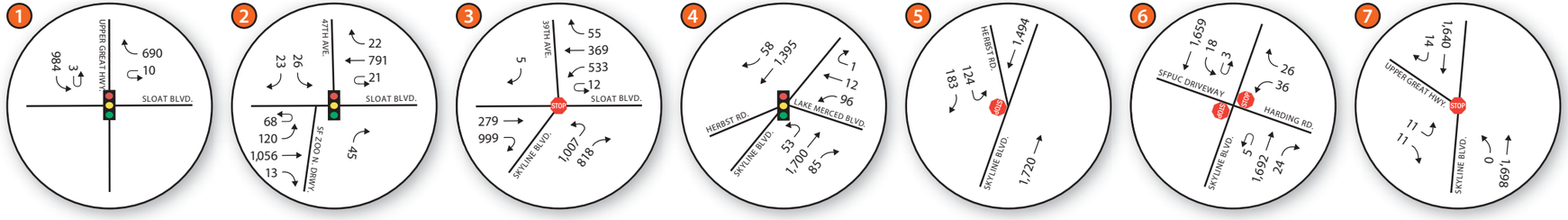



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Figure 10
Weekday PM Peak Hour Traffic Volumes Under Existing Plus Project Conditions

lane, the operating condition at the Skyline Boulevard/Harding Road intersection would improve to LOS D as vehicles on westbound Harding Road would be able to find an adequate gap in the controlled northbound traffic to make a left-turn onto the southbound merge lane on Skyline Boulevard.

### Table 13. Intersection Level of Service during Weekday PM Peak Hour

| Intersection | Control Type | Overall | | Eastbound | | Westbound | | Northbound | | Southbound | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| **Existing plus Great Highway Closure** | | | | | | | | | | | |
| 1. Upper Great Highway/ Sloat Boulevard | Signal | 40.3 | D | - | - | 40.0 | D | 0.0 | A | 40.6 | D |
| 2. Sloat Boulevard/ 47th Avenue | Signal | 7.3 | A | 8.1 | A | 5.0 | A | - | - | 25.1 | C |
| 3. Sloat Boulevard/ Skyline Boulevard | All-Way Stop | **>80** | **F** | 29.3 | D | 18.6 | C | **>80** | **F** | 10.4 | B |
| 4. Skyline Boulevard/ Herbst Road North | Signal | 7.4 | A | - | - | 33.0 | C | 6.5 | A | 6.6 | A |
| 5. Skyline Boulevard/ Herbst Road South | One-Way Stop | 20.1 | C | 20.1 | C | - | - | 0.0 | - | 0.0 | - |
| 6. Skyline Boulevard/ Harding Road | Two-Way Stop | **>80** | **F** | 26.8 | D | **>80** | **F** | 0.0 | - | 0.2 | - |
| 7. Skyline Boulevard/ Great Highway | One-Way Stop | 26.6 | D | 26.6 | D | - | - | 0.0 | - | 0.0 | - |
| **Project Variant #1** | | | | | | | | | | | |
| 1. Upper Great Highway/ Sloat Boulevard | Signal | 40.6 | D | - | - | 40.3 | D | 0.0 | A | 40.7 | D |
| 2. Sloat Boulevard/ 47th Avenue | Signal | 7.8 | A | 8.9 | A | 5.1 | A | - | - | 25.3 | C |
| 3. Sloat Boulevard/ Skyline Boulevard | All-Way Stop | **>80** | **F** | **41.0** | **E** | 18.9 | C | **>80** | **F** | 10.5 | B |
| 4. Skyline Boulevard/ Herbst Road North | Signal | 7.8 | A | - | - | 34.8 | C | 7.0 | A | 6.7 | A |
| 5. Skyline Boulevard/ Herbst Road South | One-Way Stop | 20.9 | C | 20.9 | C | - | - | 0.0 | - | 0.0 | - |
| 6. Skyline Boulevard/ Harding Road | Two-Way Stop | **>80** | **F** | 28.8 | D | **>80** | **F** | 0.0 | - | 0.2 | - |
| 7. Skyline Boulevard/ Great Highway | One-Way Stop | 28.3 | D | 28.3 | D | - | - | 0.0 | - | 0.0 | - |

## Table 13 Continued.Intersection Level of Service during Weekday PM Peak Hour

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Variant #2** | | | | | | | | | | | |
| 1. Upper Great Highway/ Sloat Boulevard | Signal | 40.5 | D | - | - | 40.2 | D | 0.0 | A | 40.7 | D |
| 2. Sloat Boulevard/ 47th Avenue | Signal | 7.2 | A | 8.0 | A | 5.0 | A | - | - | 25.1 | C |
| 3. Sloat Boulevard/ Skyline Boulevard | All-Way Stop | **>80** | **F** | 22.9 | C | 18.9 | C | **>80** | **F** | 10.5 | B |
| 4. Skyline Boulevard/ Herbst Road North | Signal | 9.3 | A | - | - | 29.8 | C | 7.7 | A | 9.7 | A |
| 5. Skyline Boulevard/ Herbst Road South | One-Way Stop | 24.7 | C | 24.7 | C | - | - | 0.0 | - | 0.0 | - |
| 6. Skyline Boulevard/ Harding Road | Two-Way Stop | **>80** | **F** | 28.8 | D | **>80** | **F** | 0.0 | - | 0.2 | - |
| 7. Skyline Boulevard/ Great Highway | One-Way Stop | 28.3 | D | 28.3 | D | - | - | 0.0 | - | 0.0 | - |
| **Project Variant #3** | | | | | | | | | | | |
| 1. Upper Great Highway/ Sloat Boulevard | Signal | 40.5 | D | - | - | 40.2 | D | 0.0 | A | 40.7 | D |
| 2. Sloat Boulevard/ 47th Avenue | Signal | 7.6 | A | 8.5 | A | 5.0 | A | - | - | 25.1 | C |
| 3. Sloat Boulevard/ Skyline Boulevard | All-Way Stop | **>80** | **F** | 41.0 | E | 18.9 | C | **>80** | **F** | 10.5 | B |
| 4. Skyline Boulevard/ Herbst Road North | Signal | 9.4 | A | - | - | 31.5 | C | 7.4 | A | 10.2 | B |
| 5. Skyline Boulevard/ Herbst Road South | One-Way Stop | 20.6 | C | 20.6 | C | - | - | 0.0 | - | 0.0 | - |
| 6. Skyline Boulevard/ Harding Road | Two-Way Stop | **>80** | **F** | 28.8 | D | **>80** | **F** | 0.0 | - | 0.2 | - |
| 7. Skyline Boulevard/ Great Highway | One-Way Stop | 28.3 | D | 28.3 | D | - | - | 0.0 | - | 0.0 | - |

## Table 13 Continued.Intersection Level of Service during Weekday PM Peak Hour

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Variant #4** | | | | | | | | | | | |
| 1. Upper Great Highway/ Sloat Boulevard | Signal | 39.8 | D | - | - | 40.2 | D | 33.4 | C | 40.7 | D |
| 2. Sloat Boulevard/ 47th Avenue | Signal | 7.3 | A | 8.1 | A | 5.0 | A | - | - | 25.1 | C |
| 3. Sloat Boulevard/ Skyline Boulevard | All-Way Stop | **>80** | **F** | 42.5 | E | 18.1 | C | **>80** | **F** | 10.1 | B |
| 4. Skyline Boulevard/ Herbst Road North | Signal | 7.6 | A | - | - | 32.9 | C | 6.5 | A | 6.9 | A |
| 5. Skyline Boulevard/ Herbst Road South | One-Way Stop | 24.7 | C | 24.7 | C | - | - | 0.0 | - | 0.0 | - |
| 6. Skyline Boulevard/ Harding Road | Two-Way Stop | **>80** | **F** | 28.7 | D | **>80** | **F** | 0.0 | - | 0.2 | - |
| 7. Skyline Boulevard/ Great Highway | One-Way Stop | 29.1 | D | 29.1 | D | - | - | 0.0 | - | 0.0 | - |
| **Program Variant** | | | | | | | | | | | |
| 1. Upper Great Highway/ Sloat Boulevard | Signal | 40.3 | D | - | - | 39.9 | D | 0.0 | A | 40.6 | D |
| 2. Sloat Boulevard/ 47th Avenue | Signal | 7.1 | A | 7.8 | A | 5.0 | A | - | - | 25.1 | C |
| 3. Sloat Boulevard/ Skyline Boulevard | All-Way Stop | **>80** | **F** | 26.1 | D | 19.5 | C | **>80** | **F** | 10.3 | B |
| 4. Skyline Boulevard/ Herbst Road North | Signal | 9.3 | A | - | - | 32.4 | C | 7.9 | A | 9.4 | A |
| 5. Skyline Boulevard/ Herbst Road South | One-Way Stop | 30.8 | D | 30.8 | D | - | - | 0.0 | - | 0.0 | - |
| 6. Skyline Boulevard/ Harding Road | Two-Way Stop | **>80** | **F** | 28.8 | D | **>80** | **F** | 0.0 | - | 0.0 | - |
| 7. Skyline Boulevard/ Great Highway | One-Way Stop | 28.3 | D | 28.3 | D | - | - | 0.0 | - | 0.0 | - |

Source: CHS Consulting Group, 2020.

Notes: LOS = level of service; **Bold** indicates intersections operating at LOS E or F. Delay is reported as seconds per vehicle. For signalized and all-way stop controlled intersections, a weighted average delay and LOS based on all intersection approaches is reported. For one- way and two-way stop-controlled intersections, delay and LOS for the worst stop-controlled approach is reported.

## 4.2 Weekend Midday Peak Hour

Traffic operational LOS was evaluated at four study intersections for the peak 60-minutes during the weekend midday peak period (12 to 4 PM) under the Existing plus Project Conditions. **Figure 11** presents the weekend midday peak hour traffic volumes for Existing plus Project Conditions. **Table 14** shows the summary of LOS and delay analysis results during the weekend midday peak hour under each project and program variant. It also includes the Existing plus Great Highway Closure scenario without any changes in zoo access patterns. This hypothetical scenario is included for comparison purposes only, to understand whether the changes are caused by diverted trips vs. SF Zoo trips. Detailed intersection LOS calculations including movement delays are provided in **Appendix C**. All study intersections would operate at LOS D or better during the weekend midday peak hour under all project and program variants.


**LEGEND**

- X — Study Intersection
- X — Study Intersection For Weekday PM Peak Period Only

N

0 400' 800' 1,600'

## Project Variant #1


## Project Variant #2


## Program Variant #3


## Project Variant #4


## Program Variant


South Ocean Beach Coastal Protection Project

Figure 11
Weekend Midday Peak Hour Traffic Volumes Under Existing Plus Project Conditions

## Table 14. Intersection Level of Service during Weekend Midday Peak Hour

| Intersection | Control Type | Overall | | Eastbound | | Westbound | | Northbound | | Southbound | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| **Existing plus Great Highway Closure** | | | | | | | | | | | |
| 1. Upper Great Highway/ Sloat Boulevard | Signal | 39.0 | D | - | - | 35.9 | D | 0.0 | A | 43.3 | D |
| 2. Sloat Boulevard/ 47th Avenue | Signal | 7.7 | A | 7.9 | A | 6.6 | A | - | - | 26.2 | C |
| 4. Skyline Boulevard/ Herbst Road North | Signal | 8.5 | A | - | - | 36.9 | D | 7.6 | A | 6.6 | A |
| 5. Skyline Boulevard/ Herbst Road South | One-Way Stop | 12.3 | B | 12.3 | B | - | - | 0.0 | - | 0.0 | - |
| **Project Variant #1** | | | | | | | | | | | |
| 1. Upper Great Highway/ Sloat Boulevard | Signal | 39.6 | D | - | - | 37.3 | D | 0.0 | A | 43.5 | D |
| 2. Sloat Boulevard/ 47th Avenue | Signal | 9.1 | A | 10.5 | B | 7.3 | A | - | - | 26.4 | C |
| 4. Skyline Boulevard/ Herbst Road North | Signal | 9.3 | A | - | - | 46.4 | D | 9.0 | A | 6.0 | A |
| 5. Skyline Boulevard/ Herbst Road South | One-Way Stop | 16.8 | C | 16.8 | C | - | - | 0.0 | - | 0.0 | - |
| **Project Variant #2** | | | | | | | | | | | |
| 1. Upper Great Highway/ Sloat Boulevard | Signal | 39.0 | D | - | - | 35.7 | D | 0.0 | A | 43.5 | D |
| 2. Sloat Boulevard/ 47th Avenue | Signal | 7.7 | A | 7.8 | A | 6.6 | A | - | - | 26.2 | C |
| 4. Skyline Boulevard/ Herbst Road North | Signal | 14.1 | B | - | - | 33.3 | C | 10.5 | B | 18.4 | B |
| 5. Skyline Boulevard/ Herbst Road South | One-Way Stop | 15.2 | C | 15.2 | C | - | - | 0.0 | - | 0.0 | - |

## Table 14 Continued. Intersection Level of Service during Weekend Midday Peak Hour

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Variant #3** | | | | | | | | | | | |
| 1. Upper Great Highway/ Sloat Boulevard | Signal | 39.0 | D | - | - | 35.7 | D | 0.0 | A | 43.5 | D |
| 2. Sloat Boulevard/ 47th Avenue | Signal | 7.9 | A | 8.2 | A | 6.6 | A | - | - | 26.2 | C |
| 4. Skyline Boulevard/ Herbst Road North | Signal | 14.8 | B | - | - | 38.1 | D | 10.6 | B | 19.1 | B |
| 5. Skyline Boulevard/ Herbst Road South | One-Way Stop | 14.4 | B | 14.4 | B | - | - | 0.0 | - | 0.0 | - |
| **Project Variant #4** | | | | | | | | | | | |
| 1. Upper Great Highway/ Sloat Boulevard | Signal | 38.1 | D | - | - | 35.7 | D | 30.7 | C | 43.5 | D |
| 2. Sloat Boulevard/ 47th Avenue | Signal | 7.8 | A | 8.0 | A | 6.6 | A | - | - | 26.2 | C |
| 4. Skyline Boulevard/ Herbst Road North | Signal | 8.6 | A | - | - | 36.9 | D | 7.6 | A | 7.0 | A |
| 5. Skyline Boulevard/ Herbst Road South | One-Way Stop | 15.8 | C | 15.8 | C | - | - | 0.0 | - | 0.0 | - |
| **Program Variant** | | | | | | | | | | | |
| 1. Upper Great Highway/ Sloat Boulevard | Signal | 38.5 | D | - | - | 35.1 | D | 0.0 | A | 43.5 | D |
| 2. Sloat Boulevard/ 47th Avenue | Signal | 7.8 | A | 7.9 | A | 6.7 | A | - | - | 26.0 | C |
| 4. Skyline Boulevard/ Herbst Road North | Signal | 13.6 | B | - | - | 37.1 | D | 10.7 | B | 15.9 | B |
| 5. Skyline Boulevard/ Herbst Road South | One-Way Stop | 16.9 | C | 16.9 | C | - | - | 0.0 | - | 0.0 | - |

Source: CHS Consulting Group, 2020.

Notes: LOS = LOS = level of service; Delay is reported as seconds per vehicle. For signalized and all-way stop controlled intersections, a weighted average delay and LOS based on all intersection approaches is reported. For one- way and two-way stop-controlled intersections, delay and LOS for the worst stop-controlled approach is reported.

# 5.0 Conclusion

Traffic operations were analyzed at seven study intersections for the weekday PM peak hour, including the Upper Great Highway/Sloat Boulevard Skyline (#1); Sloat Boulevard/47th Avenue (#2); Sloat Boulevard/Skyline Boulevard (#3); Skyline Boulevard/Herbst Road North (#4); Skyline Boulevard/Herbst Road South (#5); Skyline Boulevard/Harding Road (#6); and Skyline Boulevard/Great Highway (#7) intersections. Four of these intersections (#1, #2, #4, and #5) were also analyzed for the weekend midday peak hour condition.

All seven study intersections currently operate at LOS D or better during the weekday PM peak hour. Under the Existing plus Project Conditions (i.e., four project variants and one program variant), the Sloat Boulevard/Skyline Boulevard and Skyline Boulevard/Harding Road intersections would operate at LOS F, mainly due to increased traffic volumes along Sloat and Skyline boulevards with the diverted traffic from Great Highway. Signalizing the Sloat Boulevard/Skyline Boulevard intersection would improve its operating condition to LOS D. The Skyline Boulevard/Harding Road intersection would improve to LOS D if the upstream intersection of Skyline Boulevard/Great Highway is signalized per the Caltrans plan.

During the midday peak hour, all four study intersections currently operate at LOS D or better. Under the Existing plus Project Conditions (i.e., four project variants and one program variant), all four study intersections would continue to operate at LOS D or better.